SHARP OPTONICA

SERVICE MANUAL

APLD

DOLBY SYSTEM

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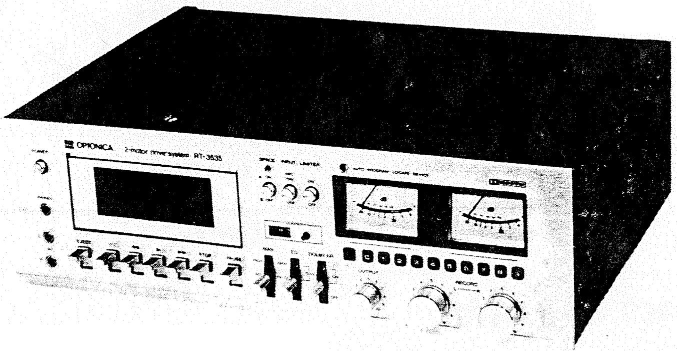


MODEL
RT-3535H

In the interests of user-safety the set should be restored to its original condition and only parts indentical to those specified be used.

SPECIFICATIONS

Type:	AC operated 4-track 2-channel Solid-state Stereo Cassette Tape Record/Playback Deck with Built-in Dolby "B" type Noise Reduction & Full-automatic Stop System
Power Source:	AC 110/220/240V, 50/60 Hz
Power consumption:	18 watts
Semiconductors:	47-Transistor, 2-FET, 59-Diode, 2-Silicon Controlled Rectifier, 3-Light Emission Diode, 2-DTL-IC, 6-TTL-IC, 1-7 seg. LED
Dimensions:	18-3/8"(W) x 13-15/16"(D) x 5-3/4"(H) 467mm(W) x 354mm(D) x 146mm(H)
Weight:	22.4 lbs. (10.2 kg)
Input circuitry:	Microphone jack 300 ~ 2K ohms x 2 Line input jack 50K ohms x 2 Record/playback Socket 40K ohms
Output circuitry:	Headphones output jack 8 ohms x 1 Line output jack 50K ohms x 2 Record/playback Socket 50K ohms
Tape:	Philips standard compact cassette tape
Tape speed:	1-7/8 ips. (4.8cm/sec)
Record/playback time:	60 minutes (C-60)
Recording system:	AC bias system (85 kHz)

Erasing system:	AC erasing
Fast Forward & Rewind time:	100 seconds (C-60)
Wow & Flutter:	0.05% W.R.M.S.
Frequency response:	30 – 17,000 Hz ±3dB (Use of Fe-Cr tape) 30 – 16,000 Hz ±3dB (Use of Cr-O_2 tape) 30 – 15,000 Hz ±3dB (Use of Normal tape)
S/N ratio:	Better than 52dB for Normal tape (weighted) at LINE-IN; without Dolby noise reduction.
Dolby N.R. effect:	10dB (at over 5 kHz)
Channel separation:	40 dB
Erase ratio:	60 dB
Input sensitivity & input impedance:	Microphone 0.2mV (300 ~ 2K ohms) Line input 70mV 50K ohms Record/playback Socket 0.1mV 1K ohms
Output level & loaded impedance:	Headphones 2mW (0dB) 50K ohms Line output 580mV (0 dB) 50K ohms Record/playback Socket 580mV (0 dB) 50K ohms

SHARP CORPORATION OSAKA, JAPAN

DISASSEMBLY (Refer to Figure 1)

CHASSIS REMOVAL

1. Remove 8 screws (A) retaining the wooden plate.
2. Gently pull upward the cabinet (B).

FRONT PANEL REMOVAL

1. Remove the cabinet as described in chassis removal.
2. Remove 6 knobs (D) from front of the panel.
3. Remove 6 screws (E) retaining the front panel (F).
4. Gently pull out the front panel (F) while holding both sides.

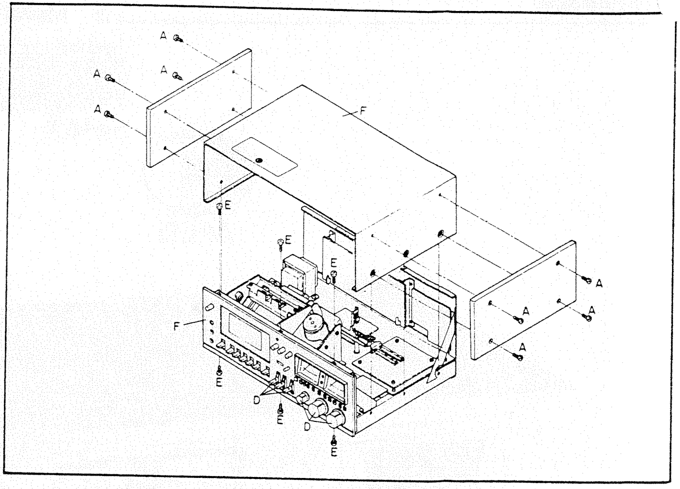
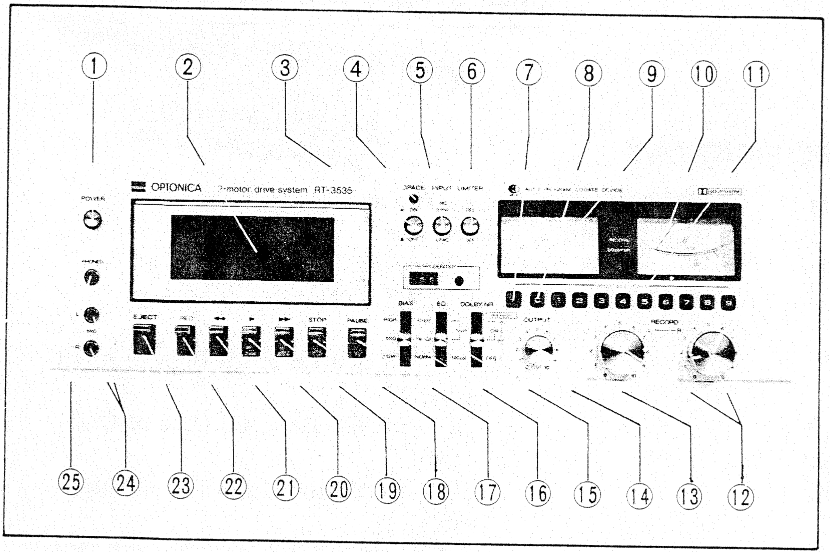

A
A
A
A
F
E
E
E
F
E
D
E
D
E
A
A
A
A

Figure 1

NAMES OF PARTS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OPTONICA 2-motor drive system RT-3535
POWER
SPACE
INPUT
LIMITER
EJECT
STOP
PAUSE
BIAS
EQ
DOLBY NR
OUTPUT
RECORD
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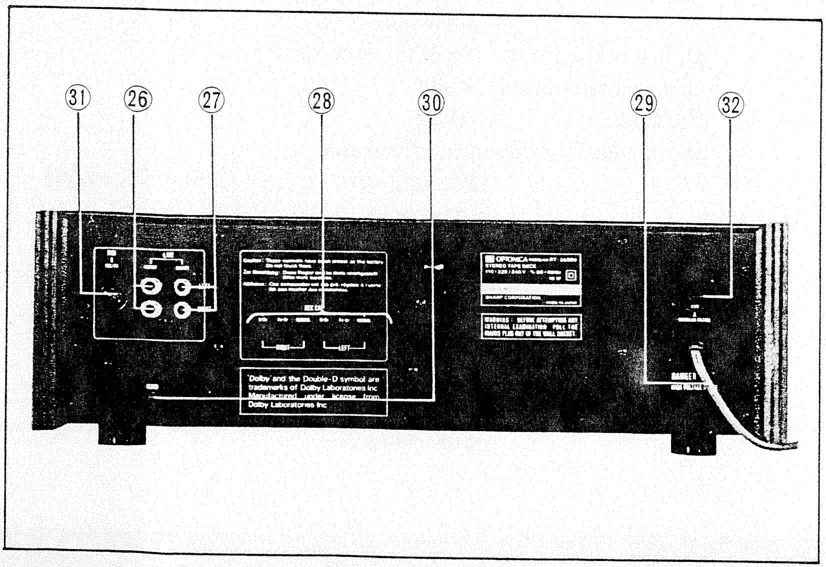
Figure 2 NAMES OF FRONT CABINET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OPTIONICA
SHARP CORPORATION
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Figure 3 NAMES OF REAR CABINET

① Power switch
② Cassette chamber
③ Space switch
④ Space control Indicator
⑤ Input switch
⑥ Limitter switch
⑦ Seven segment display
⑧ Clear KEY
⑨ Peak level meter
⑩ Peak level meter
⑪ APLD selector KEY
⑫ Record level controls
⑬ Output level control
⑭ Dolby N.R./multiplex filter switch
⑮ Equalizer selector switch
⑯ Bias selector switch
⑰ Pause KEY
⑱ Stop KEY
⑲ Fast forward KEY
⑳ Play KEY
㉑ Rewind KEY
㉒ Record KEY
㉓ Eject KEY
㉔ Microphone jacks
㉕ Headphones jack
㉖ Input jacks
㉗ Output jacks
㉘ Record level calibrator
㉙ Power supply cord
㉚ Ground terminal
㉛ Record/playback socket
㉜ Voltage selector socket

MECHANICAL ADJUSTMENT

RESSURE ROLLER PRESSURE ADJUSTMENT (Refer to Figure 4)

1. Setting the unit in PLAY mode with power supply turned on, push the point A with use of tension gauge (0 ~ 500g) to make the pressure roller apart from the capstan shaft. Read the indication of tension gauge when the pressure roller stops its rotation.
2. It is normal when the tension gauge reads 190 ~ 260 gr (6.7 ~ 9.2 oz). If the above value is not satisfied, adjust the pressure spring.

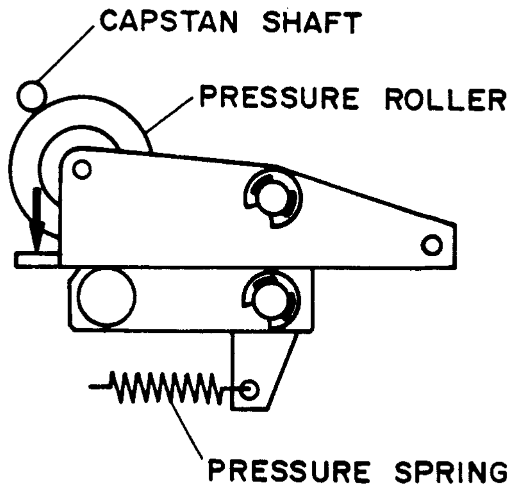

CAPSTAN SHAFT
PRESSURE ROLLER
PRESSURE SPRING

Figure 4

FLYWHEEL THRUST CLEARANCE ADJUSTMENT (Refer to Figure 5)

Slowly tighten the screw so that flywheel thrust clearance becomes 0 (zero) and loosen the screw by 1/2 turn from this point.
Since screw's pitch is 0.5 mm (3/128"), thrust clearance of about 0.2 mm (1/128") is produced.

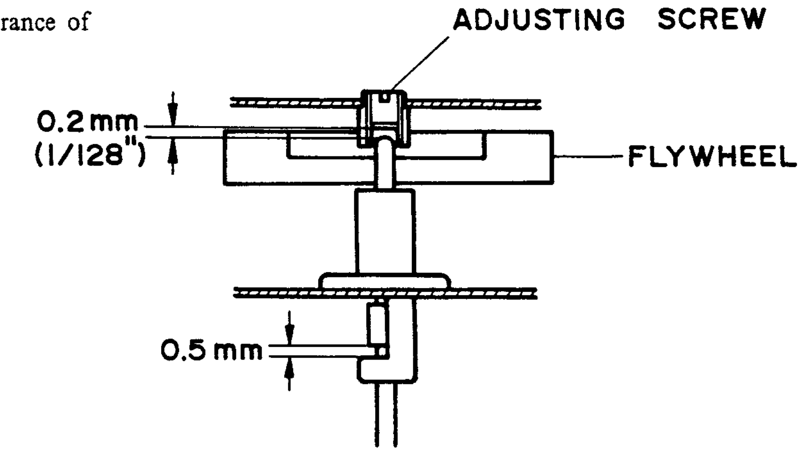

ADJUSTING SCREW
0.2 mm
(1/128")
FLYWHEEL
0.5 mm

Figure 5

TORQUE CHECK (Refer to Figure 6)

1. Set the torque measuring reel to the turntable (to the take-up side at PLAY or FAST FWD mode and to the supply side at REWIND mode).
2. Then, rotate the reel in the same direction as for turntable and read the torque value when the pointer is stabilized.

Mode	Torque value
PLAY	30 ~ 60 gr. cm
FAST FWD	Over 80 gr. cm
REWIND	Over 80 gr. cm

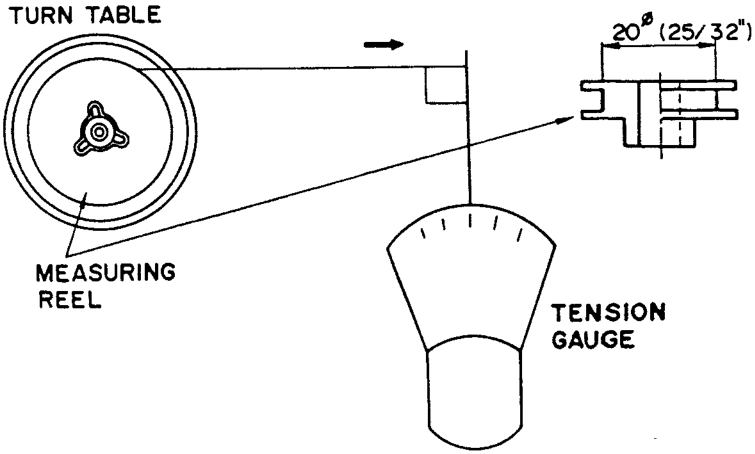

TURN TABLE
20φ (25/32")
MEASURING REEL
TENSION GAUGE

Figure 6

APLD SWITCH (SW16) SETTING POSITION ADJUSTMENT (Refer to Figure 7)

1. Loosen the screw so that the contact clearance will be 0.5 mm (1/64") in the STOP mode, as shown in Figure 7.

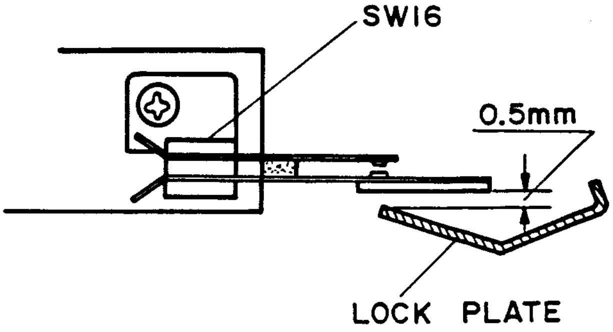


Figure 7

CAPSTAN MOTOR SWITCH (SW14) SETTING POSITION ADJUSTMENT (Refer to Figure 8)

Adjust the capstan motor so that it will be turned on or off as a result of the action of cassette holder.

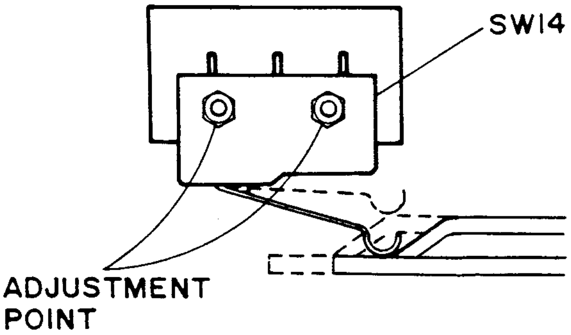


Figure 8

PAUSE SWITCH (SW4)/SPACE PAUSE SOLENOID SWITCH (SW15) TIMING ADJUSTMENT (Refer to Figure 9)

Depress the pause button to be locked. Have the space pause solenoid (SOL302) be attracted by using a hand and gently depress the pause button again so that its lock be released. Under this condition, make sure that the pause switch (SW4) is switched over and thereafter the space solenoid switch (SW15) is turned off (that is, no current is running in the space pause solenoid).

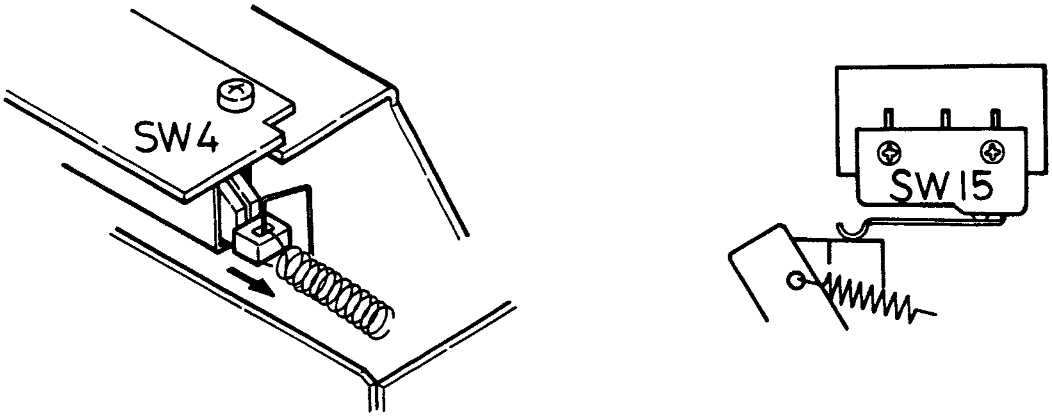


Figure 9

AUTO STOP SOLENOID SETTING POSITION ADJUSTMENT (Refer to Figure 10)
Push the plunger of auto stop solenoid (SOL301) and depress he play key.
At the time, adjust the screws retaining the auto stop solenoid so that the play key lever touches the part A of lock plate and thus the lock plate will slightly be moved by the play key lever.

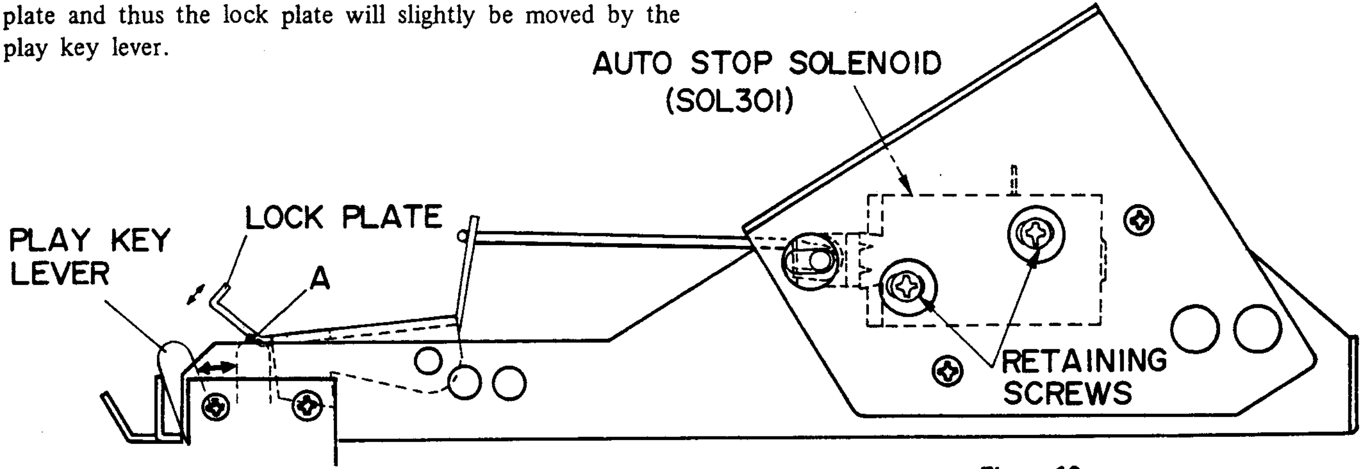


Figure 10

CHECK OF TAPE SPEED (Refer to Figure 11)

1. Playback a test tape of 3,000 Hz, available in the market.
2. Connect 50 K ohm dummy resistor LINE OUTPUT Jacks (J103C, J103D), and connect the input terminals of the speed meter or the wow meter to the resistor.
3. Adjust the measureable level by the playback Level Controls (VR109, VR110).
4. It is normal when the regeneration frequency is within ±1% of the meter.
5. When the results of measurement are not satisfactory, take off oil on the belt or pulley. When the motor or the pulley does not smoothly revolve, feel oil or change the part.
If the operation is still abnormal, adjust the semi-variable resistor (Part of Motor) in the motor by using a screw driver.

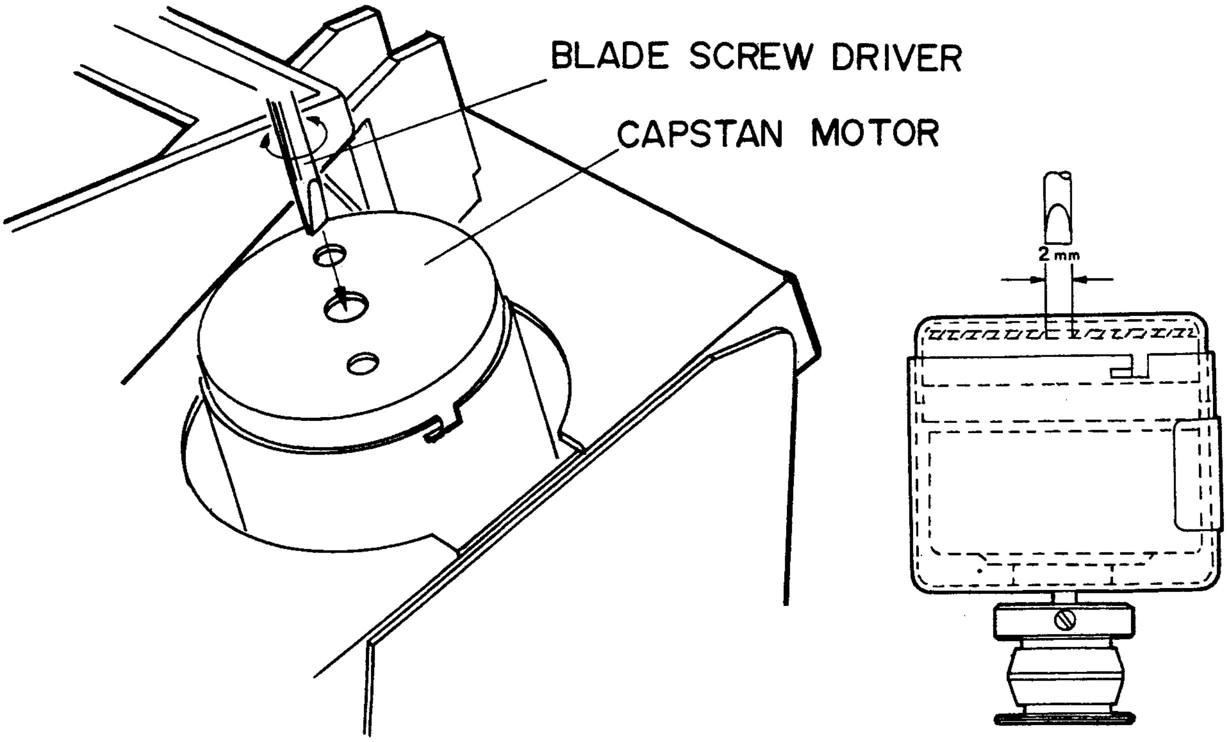


Figure 11

ELECTRICAL ADJUSTMENT

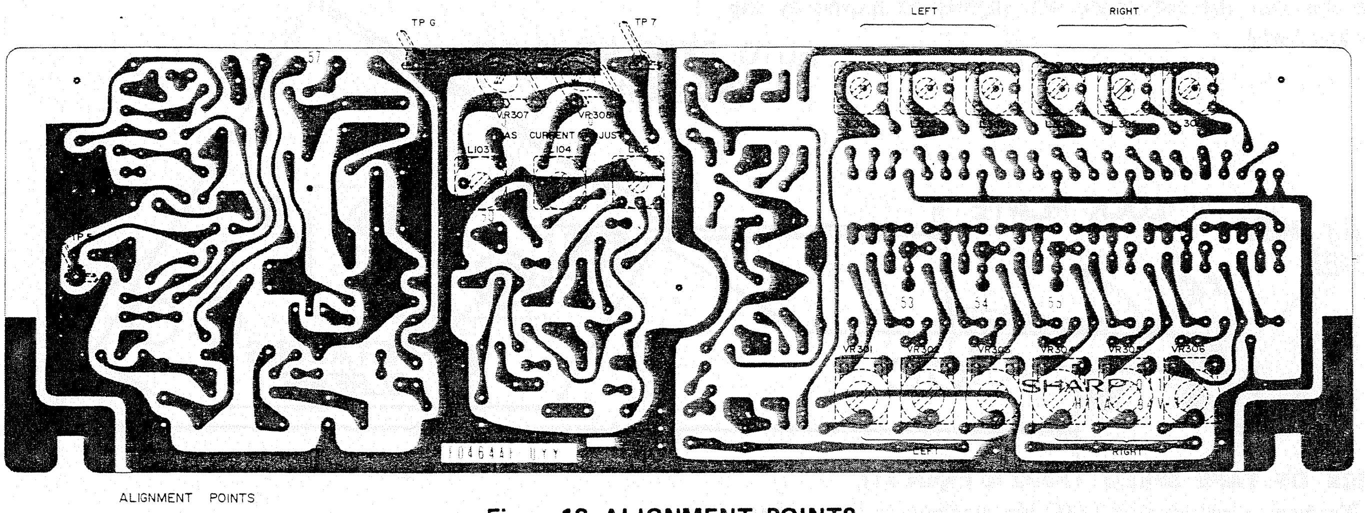

TP G
TP 7
LEFT
RIGHT
VR307
VR308
BIAS CURRENT ADJUST
L103
L104
L105
53
54
55
VR301
VR302
VR303
VR304
VR305
VR306
SHARP
LEFT
RIGHT
ALIGNMENT POINTS

Figure 12 ALIGNMENT POINTS

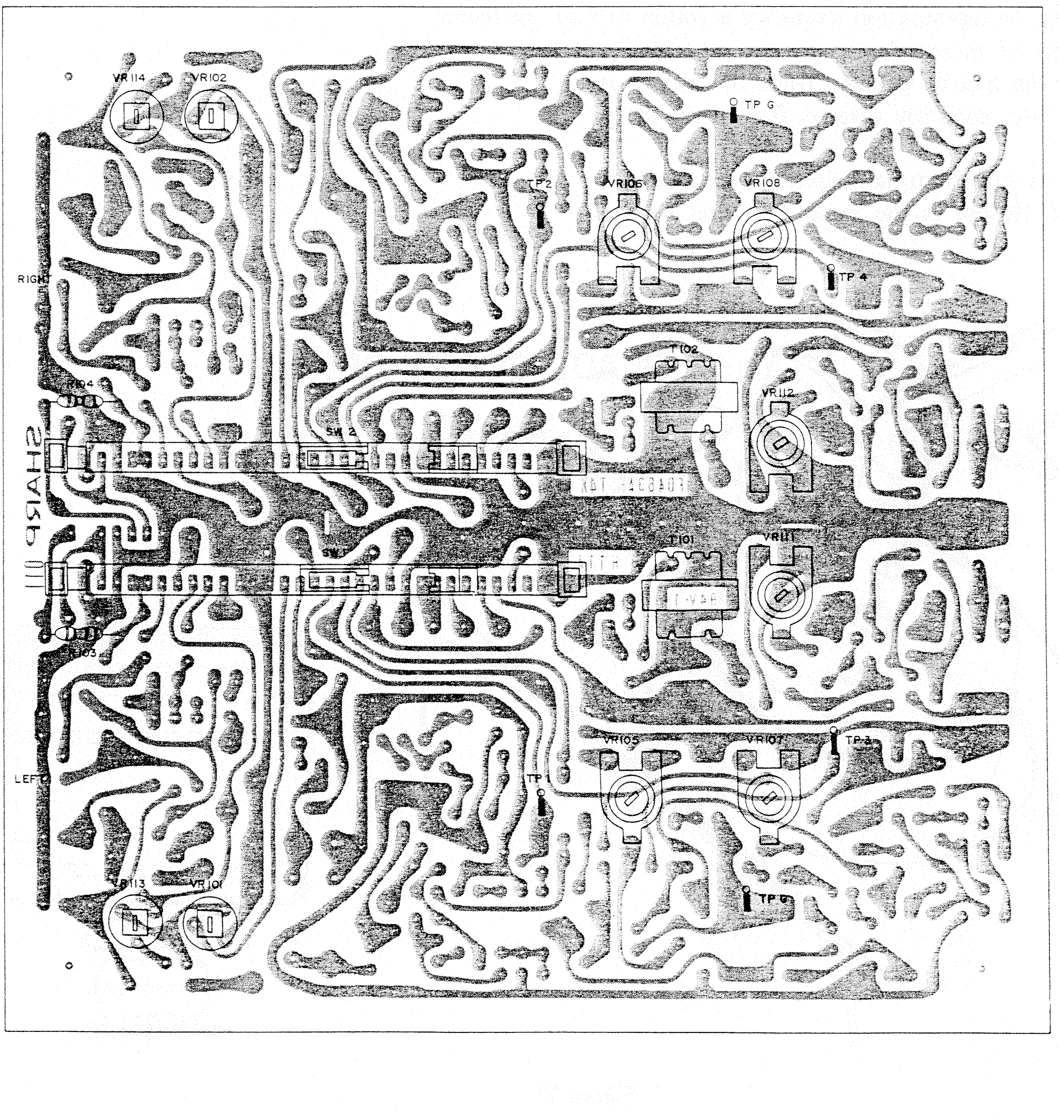

VR114
VR102
TP G
TP 2
VR106
VR108
TP 4
RIGHT
R104
T102
VR112
SW 2
SHARP
SW 1
T101
VR111
R103
VR105
VR107
TP 3
TP 1
LEFT
VR113
VR101
TP G

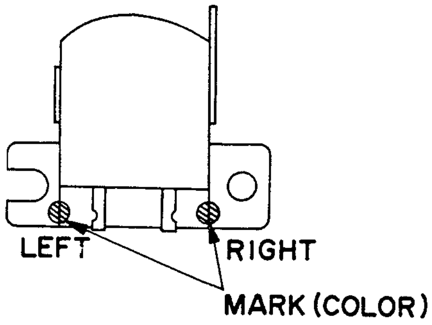
Figure 13 ALIGNMENT POINTS

RECORD AMPLIFIER BIAS OSCILLATOR ADJUSTMENT (Refer to Figure 14)

1) Connect the V.T.V.M. to the resistor (R103, R104).
2) Then, connect the frequency counter to the output terminal of the V.T.V.M.
3) When checking with normal tape, set the Bias Selector Switch (SW8) in the NORMAL position.
4) Set the unit at "RECORD" mode.
5) Adjust the oscillation coil (L105) so that the bias oscillation frequency becomes 85 kHz.
6) Adjust the semi-variable resistor (VR307, VR308) so that the V.T.V.M. reads Refer to Table 1
7) When checking with CrO2 tape, set Bias Selector Switch (SW8) in the CrO2 position.
   It is normal if V.T.V.M.'s reading is equal to the value of Table 1.
8) When ckecking with FeCr tape, set Bias Selector Switch (SW8) in the FeCr position.
   It is normal if V.T.V.M.'s reading is equal to the value of Table 1.

Tape Mark	Normal	FeCr	CrO2
Green	37.5 mV	37.5 ~ 42.5 mV	48.0 ~ 60.0 mV
Black	42.0 mV	42.5 ~ 47.5 mV	54.0 ~ 66.0 mV
No mark	46.5 mV	47.5 ~ 52.5 mV	61.0 ~ 73.0 mV
Red	51.5 mV	52.5 ~ 57.5mV	69.0 ~ 81.0 mV
Blue	56.0 mV	57.5 ~ 62.5 mV	74.0 ~ 86.0 mV

Table 1



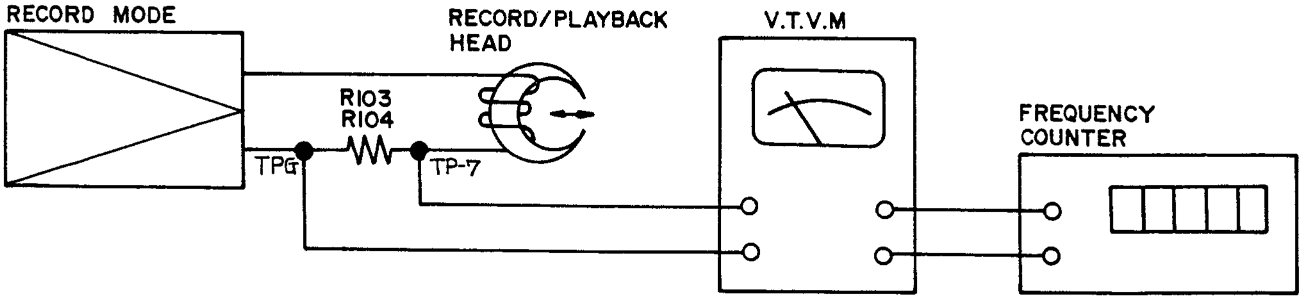


Figure 14

ERASE CURRENT CHECK (Refer to Figure 15)

1) Set the unit at "RECORD" mode with CrO2 tape.
2) Set the Bias Selector Switch (SW8) in the CrO2 position.
3) Connect V.T.V.M. to the test point (TP7) and earth (TP-G).
   It is normal if V.T.V.M.'s reading is 65 ~ 105 mV.
4) To check with the NORMAL tape, leave Bias Selector Switch (SW8) in the NORMAL position.
   It is normal if V.T.V.M.'s reading is 40 ~ 80 mV.
5) To check with the FeCr tape, leave Bias Selector Switch (SW8) in the FeCr position.
   It is normal if V.T.V.M.'s reading is 45 ~ 85 mV.

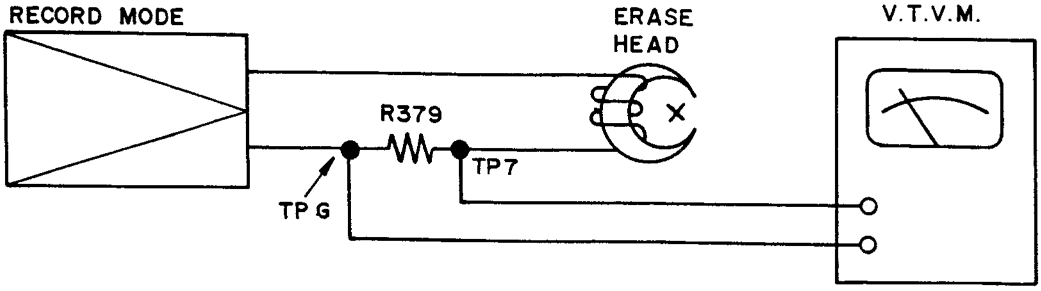
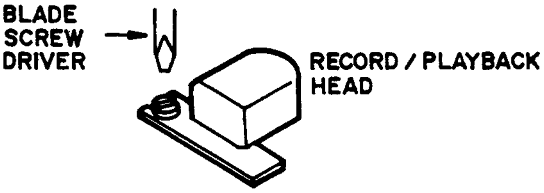


Figure 15

RECORD/PLAYBACK HEAD AZIMUTH ADJUSTMENT (Refer to Figure 16)

1) Set Dolby Noise Reduction/MPX Filter Switch (SW10) in the off position.
2) Set Equalizer Selector Switch (SW9) in the NORMAL position.
3) Connect 50K ohm dummy resistor to the LINE OUTPUT Jacks (J103C, J103D) and connect the V.T.V.M. to its ends.
4) Insert the test tape (MTT-114, 10 kHz Recorded) and play it.
5) Adjust the adjusting screw so that the playback output voltage of the test tape becomes maximum in the sides and the phase between channels gets same.


BLADE SCREW DRIVER
RECORD / PLAYBACK HEAD

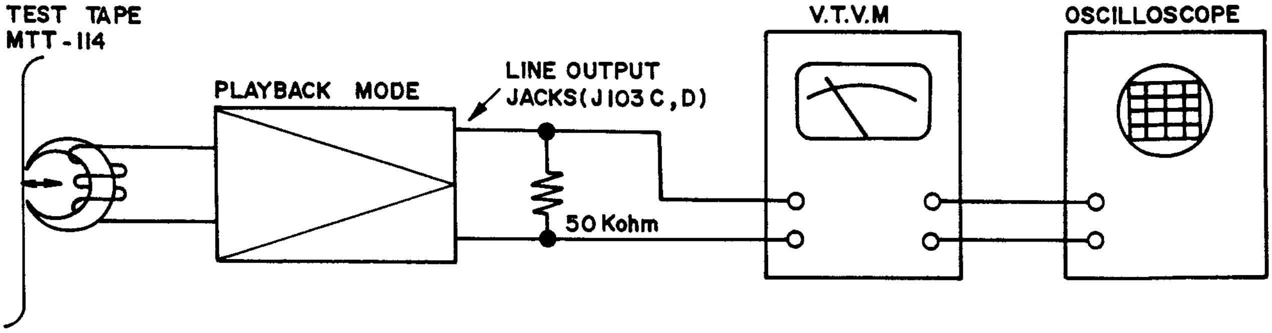

TEST TAPE MTT-114
PLAYBACK MODE
LINE OUTPUT JACKS(J103C,D)
50 Kohm
V.T.V.M
OSCILLOSCOPE

Figure 16

PLAYBACK SENSITIVITY ADJUSTMENT (Refer to Figure 17)

1) Set Dolby Noise Reduction/MPX Filter Switch (SW10) in the off position.
2) Set Equalizer Selector Switch (SW9) in the NORMAL position.
3) Connect the V.T.V.M. in between the test point (TP1, TP2) and earth.
4) Insert the test tape (MTT-150, 400 Hz, 200pWb/mm^2 recorded) and play it.
5) At this time, adjust the semi-variable resistor (VR101, VR102) so that the V.T.V.M. reads 580 mV.

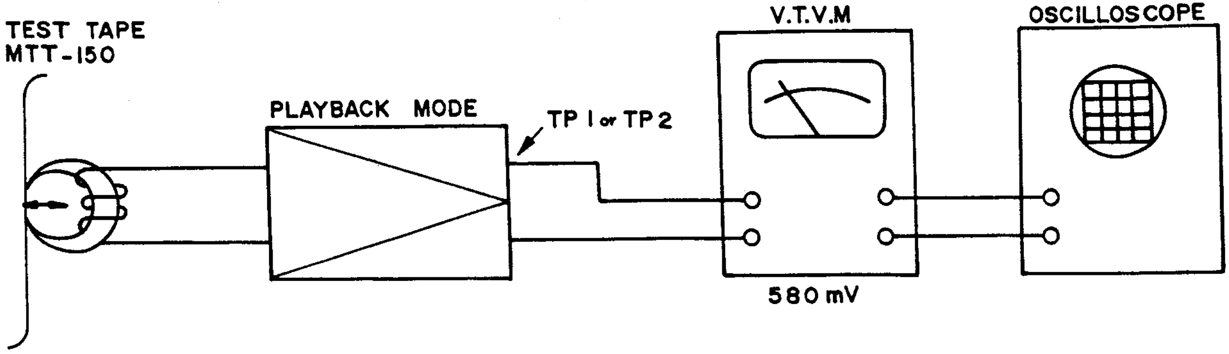
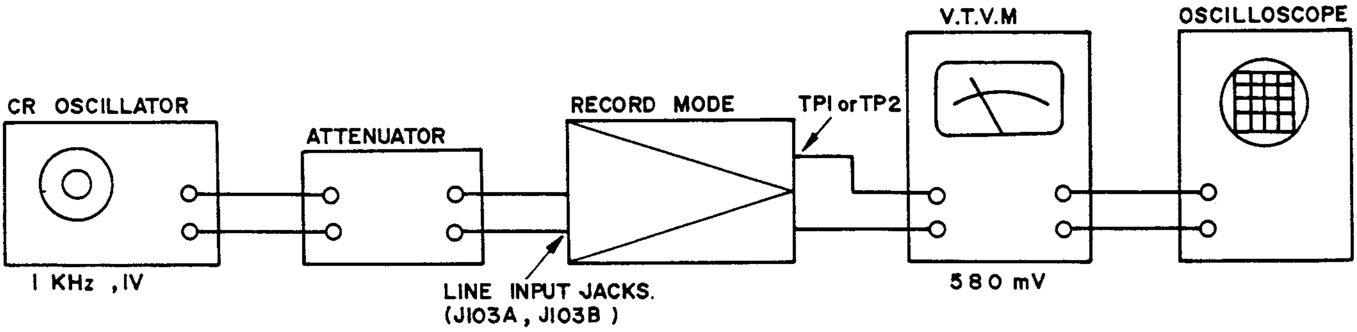

TEST TAPE MTT-150
PLAYBACK MODE
TP 1 or TP 2
V.T.V.M
OSCILLOSCOPE
580 mV

Figure 17

LEVEL METER SENSITIVITY ADJUSTMENT (Refer to Figure 18)

1) Connect the V.T.V.M. in between the test point (TP1, TP2) and earth.
2) Set Dolby Noise Reduction/MPX Filter Switch (SW10) in the off position, and Input Selector Switch (SW6) in the LINE INPUT position.
3) With the unit set at "RECORD" mode, give it signal of −10 dB, 1 kHz from LINE INPUT Jacks (J103A, J103B) and Record Level Control (VR103, VR104) so that the V.T.V.M. reads 580 mV.
4) At the time, adjust the semi-variable resistor (VR111, VR112) so that the level meter indicates Dolby Level (it means a level of "0 dB" indicated on the level meter.)

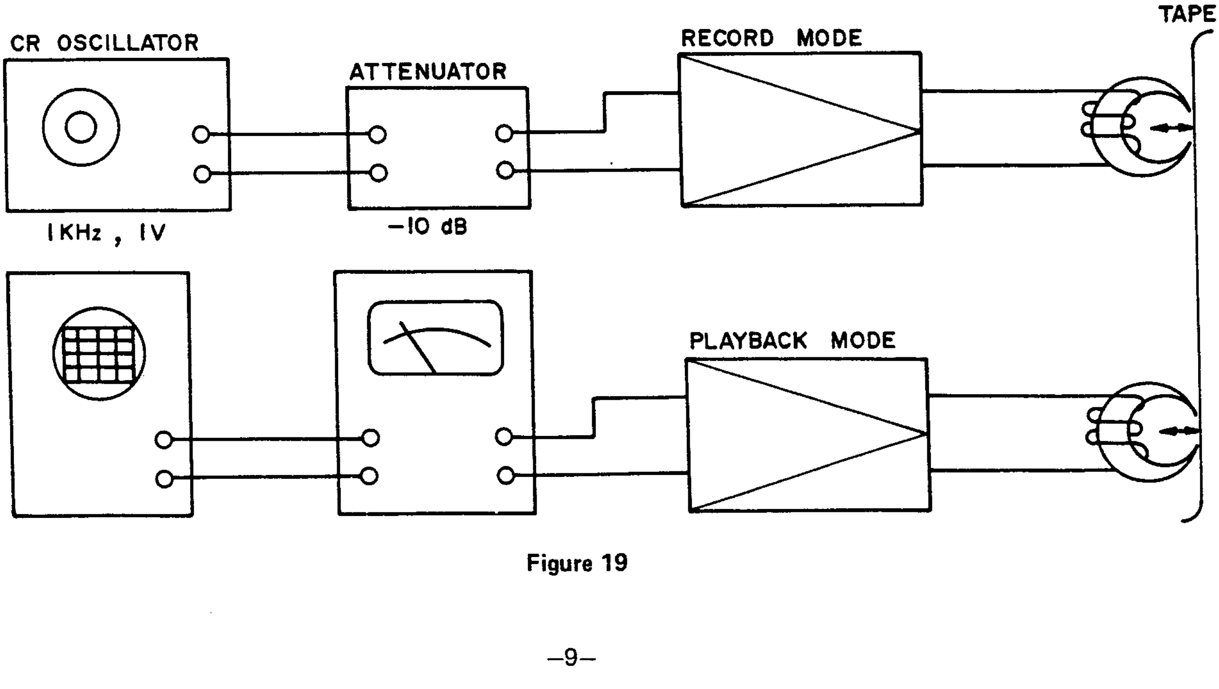


V.T.V.M
OSCILLOSCOPE
CR OSCILLATOR
RECORD MODE
TP1 or TP2
ATTENUATOR
1 KHz ,1V
LINE INPUT JACKS.
(J103A, J103B)
580 mV

Figure 18

RECORD/PLAYBACK SENSITIVITY ADJUSTMENT (Refer to Figure 19)

1) Connect the V.T.V.M. in between the test point (TP1, TP2) and earth.
2) Set Dolby Noise Reduction/MPX Filter Switch (SW10) in the off position, and Input Selector Switch (SW6) in the LINE INPUT position.
3) Insert the tape (Normal tape: MTT-502, FeCr tape: SONY Duad Fe-Cr, CrO_2 tape: MTT-505 or BASF TP-18 CrO_2).
4) With the unit set at "RECORD" mode, give it signal of −10dB, 1 kHz from LINE INPUT Jacks (J103A, J103B) and adjust Record Level Control (VR103, VR104) so that the V.T.V.M. reads 580 mV.
5) Adjust the semi-variable resistor (Normal tape: VR301/VR304, FeCr tape: VR302/VR305, CrO_2 tape: VR303/VR306) so that the V.T.V.M. reads the playback voltage of 580 mV.



TAPE
CR OSCILLATOR
RECORD MODE
ATTENUATOR
1KHz , 1V
−10 dB
PLAYBACK MODE

Figure 19

CORD CIRCUIT FREQUENCY CHARACTERISTIC ADJUSTMENT (Refer to Figure 20)

Connect the V.T.V.M. to the resistor (R103, R104).

Set Dolby Noise Reduction/MPX Filter Switch (SW10) in the off position, and Input Selector Switch (SW6) in the LINE INPUT position.

With the unit set at "RECORD" made, give it signal of –30 dB, 1 kHz from LINE INPUT Jacks (J103A, J103B) and adjust Record Level Control (VR103, VR104) so that the V.T.V.M. reads 1 mV.

Set Equalizer Selector Switch (SW9) in the Normal position.

Then change the oscillator frequency to 15 kHz and adjust peaking coil (L301, L304) so that the deviation to 1 mV is +18 dB.

Set Equalizer Selector Switch (SW9) in the FeCr position.

Then change the oscillator frequency to 17 kHz and adjust peaking coil (L302, L305) so that the deviation to 1 mV is +16 dB.

Set Equalizer Selector Switch (SW9) in the CrO₂ position.

Adjust peaking coil (L303, L306) so that the deviation to 1 mV is +16 dB.

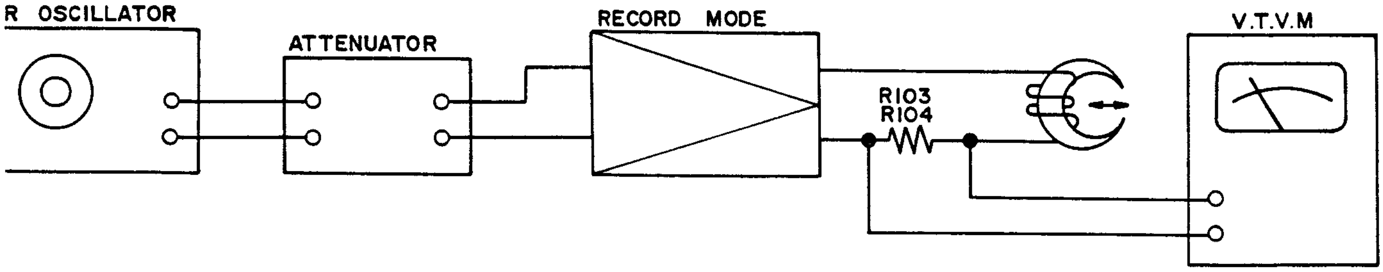


Figure 20

LBY NOISE REDUCTION ADJUSTMENT (Refer to Figure 21)

Set Input Selector Switch (SW6) in the LINE INPUT position.

With the unit set at "RECORD" mode, give it signal of –10 dB, 5 kHz from LINE INPUT Jacks (J103A, J103B).

Rotate semi-variable resistor (VR105, VR106) in the maximum position (VR105: Fully clockwise, VR106: Fully counterclockwise).

Connect the test point (TP3, TP4) to the earth point.

Connect the V.T.V.M. in between the test point (TP1, TP2) and earth point.

Set Dolby Noise Reduction Switch (SW10) in the off position.

Adjust the Record Level Control (VR103, VR104) so that the V.T.V.M. reads 17.5 mV.

Set Dolby Noise Reduction/MPX Filter Switch (SW10) in the on position.

Adjust the semi-variable resistor (VR107, VR108) so that the V.T.V.M. reads 55.4 mV.

) Disconnect the test point (TP3, TP4) from the earth point.

) Adjust the semi-variable resistor (VR105, VR106) so that the V.T.V.M. reads 44 mV.

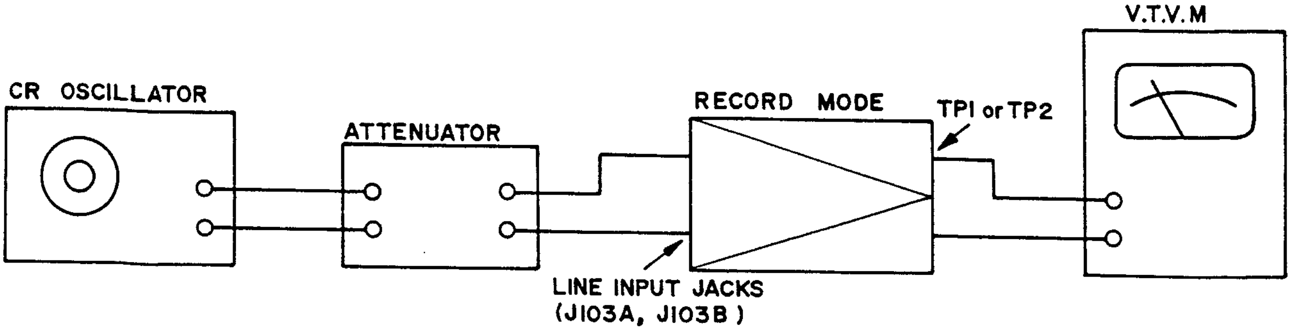


Figure 21

DOLBY NOISE REDUCTION CIRCUIT CHECK (Refer to Figure 22)

1) Connect the V.T.V.M. in between the test point (TP1, TP2) and earth.
2) Set Dolby Noise Reduction/MPX Filter Switch (SW10) in the on position, and Input Selector Switch (SW6) in the LINE INPUT position.
3) With the unit set at "RECORD" mode, give it signal of –35 dB, 100 Hz from LINE INPUT Jacks (J103A, J103B) and adjust Record Level Control (VR103, VR104) so that the V.T.V.M. reads 32.6 mV.
4) Give the unit 1 kHz signal, 5 kHz signal and 10 kHz signal in the order and if the V.T.V.M. reads as tabulated below with each input signal, it is normal.

Frequency	1 kHz	5 kHz	10 kHz
V.T.V.M. reads	53 ~ 75 mV	53 ~ 75 mV	44 ~ 63 mV

5) Give the unit signal of –50 dB, 100 Hz and adjust Record Level Control (VR103, VR104) so that the V.T.V.M. reads 5.8 mV.
6) In the same manner as in the step 4 above, give the unit 1 kHz signal, 10 kHz signal and 12.5 kHz signal in the order and if the V.T.V.M. reads as tabulated below with each signal, it is normal.

Frequency	1 kHz	10 kHz	12.5 kHz
V.T.V.M. reads	9.5 ~ 13.4 mV	16 ~ 23 mV	15 ~ 24 mV

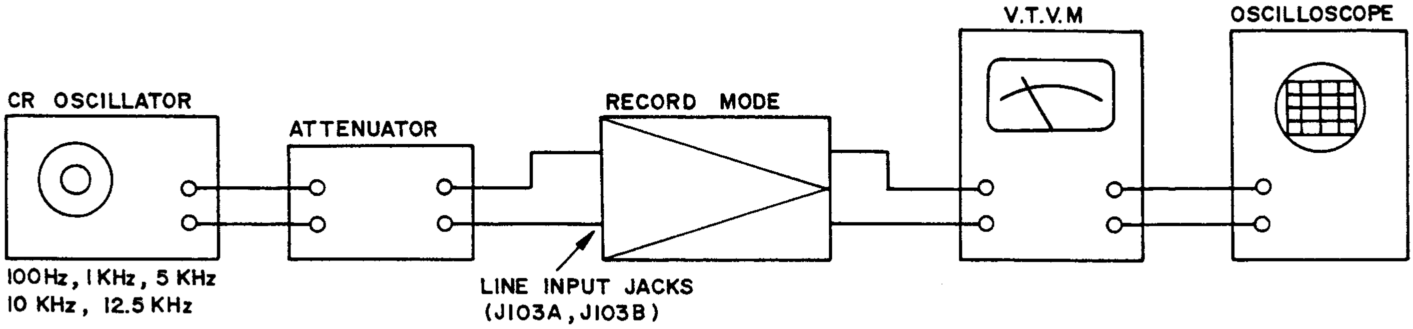

V.T.V.M
OSCILLOSCOPE
CR OSCILLATOR
RECORD MODE
ATTENUATOR
100Hz, 1KHz, 5 KHz
10 KHz, 12.5 KHz
LINE INPUT JACKS
(J103A, J103B)

Figure 22

BASIC UNDERSTANDINGS OF DIGITAL CIRCUIT

DECIMAL DIGIT	BINARY	CORDED	DECIMAL	
	D (8)	C (4)	B (2)	A (1)
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
0	0	0	0	0

Figure 23

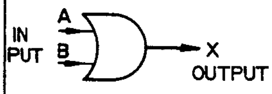
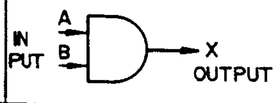
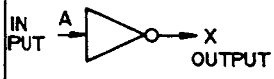
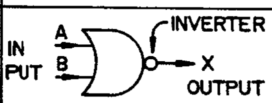
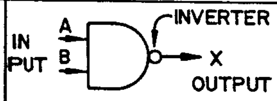
	GATE	LOGICAL SYMBOL	BOOLEAN ALGEBRA
①	OR GATE		X = A + B
②	AND GATE		X = A x B (X = A · B)
③	INVERTER GATE		$X = \overline{A}$
④	NOR GATE		$X = \overline{A + B}$
⑤	NAND GATE		$X = \overline{A \times B}$ $(X = \overline{A \cdot B})$

Figure 24

INPUT		OUTPUT
A	B	X
0	0	0
1	0	1
0	1	1
1	1	1

Figure 25

INPUT		OUTPUT
A	B	X
0	0	0
1	0	0
0	1	0
1	1	1

Figure 26

APLD (Auto Program Locate Device) Circuit

With this unit, a digital IC circuit is employed so that it functions as A.P.L.D. in which the APLD selector keys 1 thru 9 are provided to select desired programs at extremely high speed.

DIGITAL IC CIRCUIT

This digital IC circuit is energized in either of two ways to represent the binary digits 0 or 1; i.e., the digit 0 means that the given voltage is lower than the threshold voltage 1.5V while the digit 1 represents that it is higher than the threshold voltage. The threshold voltage 1.5V of this unit may slightly vary with the change of ambient temperature and/or quality dispersion of IC to be used.

In case the voltage is 5.0V, the unit becomes "1" level or "High" level and in case it is 0V, the unit becomes "0" level or "Low" level. In dealing with this unit, the integrated circuits IC-101 and IC-102 are used to convert decimal notation digits 0 ~ 9 to the equivalents in the binary notation system – see Fig. 23 (Binary Coded Decimal.) These IC-101 and IC-102 are called an encoder (to convert decimal digits to binary digits). While, IC-104 is called a decoder (to convert binary digits to decimal digits).

EXPLANATIONS OF DIGITAL IC CIRCUIT

(Refer to Fig. 24)

With the digital IC circuits there are several sorts of logic element, i.e. gate according to the types of IC to be used.

This digital IC circuit incorporates various gates the functions of which are different from each other.

The gate ① is called OR gate and the truth table Fig. 25 represents the relationship between logical symbols, say, input terminal A · B and output terminal X. According to this truth table, it can be understood that the OR gate produces the output signal X of "1" if any of the input signals A and B is "1". This relation is expressed as X = A + B by Boolean algebra. If there are three input signals and more, the OR operation results in the output signal "1" if any one of these input signals is "1".

The gate ② is called AND gate and the truth table Fig. 26 represents the relationship between logical symbols, say, input terminal A · B and output terminal X. According to this truth table, it can be understood that the AND gate produces the output signal X of "1" only if both input signals A and B have this value. This relation is expressed as X = A x B (X = A · B) by Boolean algebra.

Also in case there are three input signals and more, the AND operation results in the output signal "1" only if all of these input signals are "1".

INPUT	OUTPUT
A	X
0	1
1	0

Figure 27

INPUT		OUTPUT
A	B	X
0	0	1
1	0	0
0	1	0
1	1	0

Figure 28

INPUT		OUTPUT
A	B	X
0	0	1
1	0	1
0	1	1
1	1	0

Figure 29

The gate ③ is called INVERTER gate and the truth table Fig. 27 shows the relationship between the input terminal A and output terminal X. According to this truth table. it can be understood that the value of the input terminal is the opposite of that of the output terminal X. That is, the output signal X becomes "1" when the input signal A is "0" while it becomes "0" when the input signal is "1". This relation is expressed as X = A by Boolean algebra. The above descriptions result in a conclusion that the INVERTER operation always depends on one input signal and the input and output signals are reverse to each other.

The gate ④ is called NOR gate (Negative OR Gate) and truth table Fig.28 shows the relationship between the input terminal A · B and output terminal X. According to this truth table, it can be understood that the output signal X as a result of NOR operation is the opposite of that as result of OR operation in Fig. 25 – therefore, this relation can be interpreted as meaning the same as that the output signal X as a result of OR operation ① has undergone INVERTER operation ③. The above relation is expressed as $X = \overline{A + B}$ by Boolean algebra. If there are three input signals and more the NOR operation results in the output signal "1" only if all of these input signals are "0". (Refer to Fig. 30) The gate ⑤ is NAND gate (Negative AND Gate) and the truth table Fig. 29 represents the relationship between the input terminal A · B and output terminal X. According to this truth table, it can be understood that the output signal X as a result of the NAND operation is the opposite of that due to the AND operation in Fig. 26 – therefore, this relation can be interpreted as meaning the same as that the output signal X as a result of AND operation ② has undergone INVERTER operation ③. The above relation is expressed as $X = \overline{A \times B}\ (\overline{A \cdot B})$ by Boolean algebra. If there are three input signals and more, the NAND operation results in the output signal of "0" only if all these input signals have the value "1" but is "1" if any one of the inputs has this value. The above descriptions result in a conclusion that the NAND operation produces the output "0" only if all the inputs are "1" (Refer to Fig. 31).

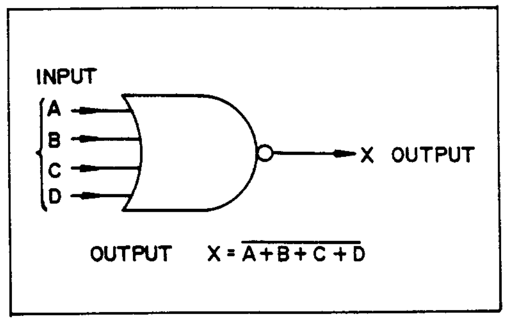


Figure 30

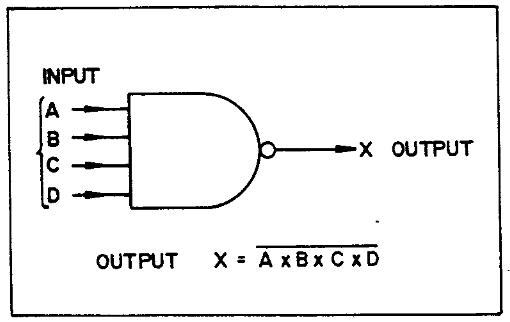


Figure 31

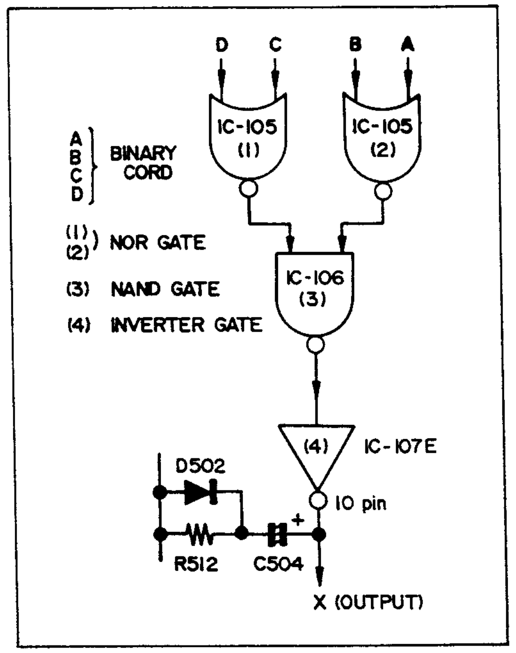


Figure 32

- Next, we will explain the method which enables reading the meanings indicated by Circuit Diagram. Fig. 32 represents a part of the pre-set circuit RT-3535H, in which the gates (1) and (2) are NOR gate, the gate (3) is NAND gate and the gate (4) is INVERTER gate. In this circuit, the output X is determined by Boolean algebra;

$$\overline{\overline{\overline{(A + B)}\quad\overline{(C + D)}}} = \overline{(A + B)} \cdot \overline{(C + D)} = \overline{A + B + C + D}$$

This means there are four input signals A, B, C and D which are to undergo NOR operation. Therefore, as said above, this NOR gate operation results in the output X of "1" only if all of these inputs A, B, C and D are "0".

- In addition to the above method using Boolean algebra, the value of the output X can be known by observing the relationships between inputs and outputs of the gates ① thru ⑤ by using the truth tables Fig. 25 ~ 29.

It is now assumed that the values of the inputs A, B, C and D are respectively "0". Since the inputs A and B are subjected to NOR operation, the output becomes "0" according to Fig. 28 and in the same way the output in the connection with the inputs C and D becomes "1" (1).

Therefore, the output as a result of NAND operation (3) shown in Fig. 32 (3) becomes "0" according to Fig. 29. As to the INVERTER gate (4), since the input is "0" the output becomes "1".

As seen from the above descriptions both methods, say, one using Boolean algebra and another based on observation of the circuit diagram are available for determining the value of the output X.

Compared with Boolean algebra method, it is easier to use the truth tables (Fig. 25, 26, 27, 28, 29) related to the gates ① thru ⑤ for finding the value of the output X.

- In this connection, it is asked to remember such principales that;

The NAND gate ⑤ operation results in output of "0" only if all of inputs are "1" and the NOR gate ④ operation produces output of "1" only if all of inputs are "0" – make use of these principales to find out the value of the output X shown in Fig. 32. It is now supposed that the inputs A, B, C and D are respectively "1", "0", "0" and "0"

According to the above principales, it can be seen that the output as a result of the NOR operation (1) is "1" and that by the NOR operation (2) is "0" (in the latter case, this is because that the NOR operation results in the output of "0" if any one of the inputs is "1"). The gate (3) is NAND gate of which inputs are obtainable from the outputs of the gates (1) and (2). Therefore, the NAND gate (3) operation results in the output of "1" since one of its inputs is "0". The gate (4) is INVERTER gate and its output becomes "0" as we have described that the value of input is reverse to that of output in the case of INVERTER gate operation.

Referring to thepre-set circuit shown in Fig. 32, at the input terminals (A ~ D) are caused signals when APLD selector key is depressed (strobe pulse generator circuit). With this depression, any one of four input Terminals (A ~D) becomes "1" and then the output signal at IC-107E (10-pin) becomes "0" On the other hand, unless the APLD selector key is depressed all of four output signals at IC-101 and IC-102 become "0" and thus the output signal at IC-107E (10-pin) becomes "1" The 10-pin line of IC-107E is provided with C504 and R512 so that the output generation of IC-107E is delayed. (It is called a delay circuit.)

DECIMAL-TO-BINARY CONVERSION CIRCUIT

(Refer to Fig. 23)

With this converter circuit numbers 1 thru 9 corresponding to APLD selector keys which are represented in the decimal notation are converted to their 4-digit equivalent binary notation numbers. This conversion mainly depends upon APLD selector keys (1 ~ 9) and gates at IC-101 and IC-102. Each digit of 1 thru 9 related to the APLD selector keys may be represented in a binary coded decimal (BCD code), i.e. each digit is expressed as $D = 8(2^3)$, $C = 4(2^2)$, $B = 2(2^1)$ and $A = 1$. It is now assumed that the APLD selector key 8 is depressed. This number 8 may be represented as 1000 in the binary notation.

BEHAVIOR OF COUNTER CIRCUIT

The digital circuit depends upon the functions of counter and besides counting the number of pulses, the counter may convert signal, voltage and current into pluses. The APLD IC employed in this unit is a sychronous decade up/down counter (RH-IX1028AFZZ IC-103) and it displays simultaneously such functions as of memory circuit to temporarily store the numbers, addition/subtraction circuit to add to or deduct 1 from the momorized number and clear circuit to efface the momorized number.

Fig. 33 shows IC-103 and the location of its input and output terminals pin 1 thru pin 16. This circuit may function only if the following conditions are concurrently satisfied:

(1) Ground terminal of the pin 8 is grounded.
(2) Vcc terminal of the pin 16 is of 5V.
(3) Strobe terminal of the pin 11 is changed to "0" from "1" when there arise pre-set input (A ~ D IN).(This terminal is kept to "1" when no signal AIN ~ DIN is generated.)
(4) Clear terminal of the pin 14 is kept to "0" except when the APLD selector key C is depressed.

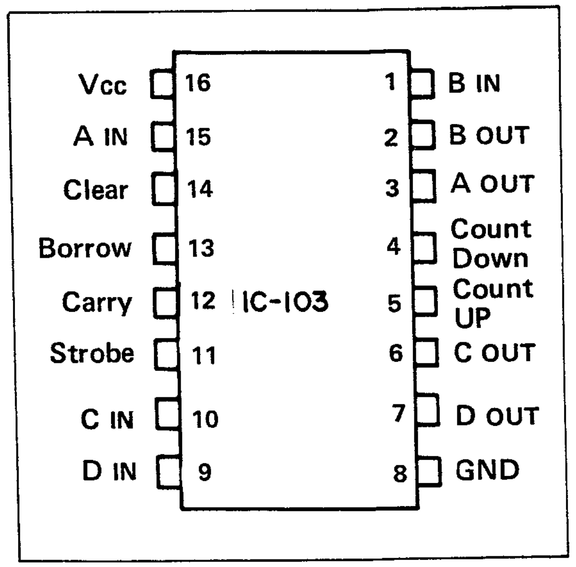


Figure 33

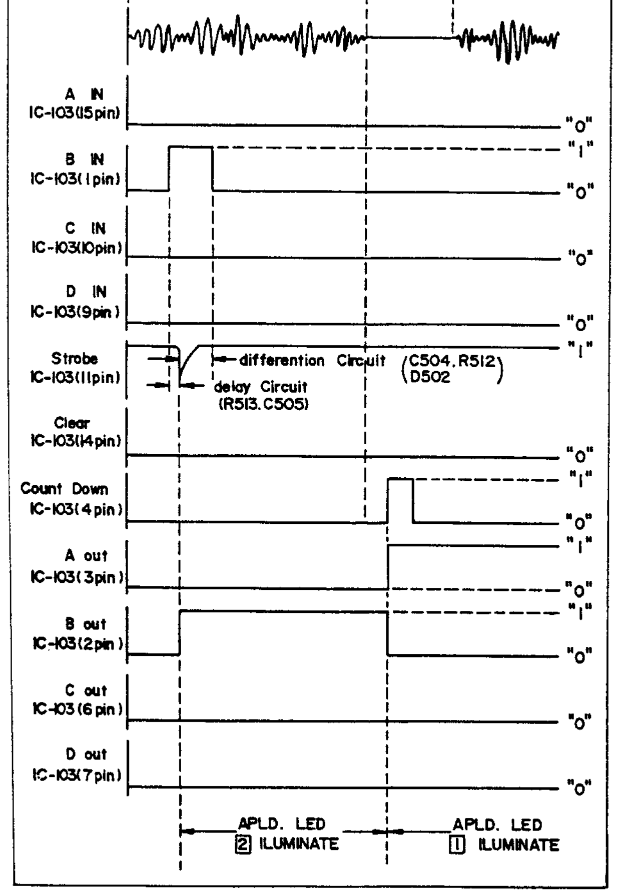


Figure 34

It is now supposed that the APLD selector key $\boxed{2}$ is depressed to select 2nd program and its related conditions of input and output signals at IC-103 are shown in Fig. 34.

The number 2 related to the key $\boxed{2}$ is equivalent to 0010 in the binary notation. (Refer to Fig. 23). This leads to AIN · CIN · DIN = "0" and BIN = "1". When signal of "1" is generated at BIN, strobe pulse is also produced, by the differentiation circuit formed by C504, R512 and D502 and the delay circuit consisting of R513 and C505. This strobe pulse is kept to "1" as long as there arise no input signal at AIN ~ DIN.

- The delay circuit is to compensate for dispersion of each IC operation time with respect to the preset-input and the differentiation circuit is to determine time in which C504 may discharge.

The output signal B out remains "1" until count-down signal will be created by APF circuit. As to the APF circuit, refer to "Clock Pulse Generation Circuit" described later. Count-down signal is generated each time blank section of a tape is detected by the program detector circuit and this results in counting down of the number of programs contained in a tape (like 2 = 0010 → 1 = 0001 → 0 = 0000).

The tape will automatically stop when the count-down signal 0000 is produced.

The clear terminal at the pin 14 of IC-103 is designed to be always at "1" so that the APLD won't accidentally function due to noises in both play and record mode.

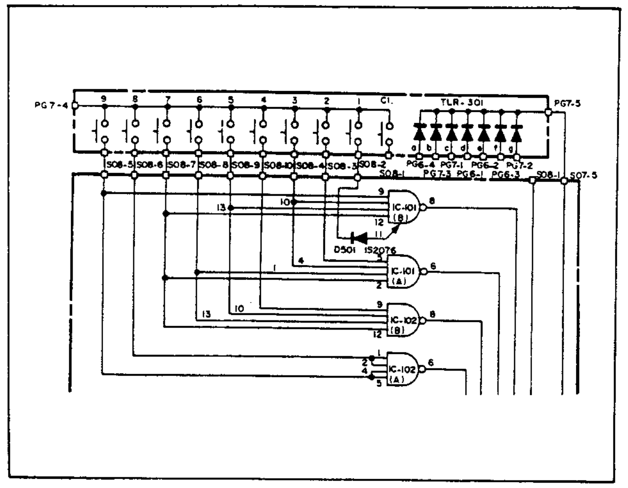


Figure 35

It is assumed that to APLD selector key $\boxed{2}$ is depressed. According to Fig. 23, it can been seen that the BCD (Binary Corded Decimal) corresponding to the number of the key $\boxed{2}$ is of D = 0, C = 0, B = 1 and A = 0. When the $\boxed{2}$ key is depressed, negative voltage is applied to the pin 5 of IC-101 through SO8-3.

With these four NAND gates (IC-101, IC-102), when the input terminal is given no input signal its voltage becomes 1.7V which is referred to as "1" level. On the other hand, when the input terminal is given an input signal its voltage becomes −2.6V which is referred to as "0" level.

Then, the APLD selector key 2 is depressed. The level "0" at the pin 6 of IC-102, the level "0" at the pin 8 of IC-102, the level "1" at the pin 6 of IC-101 and the level "0" at the pin 8 of IC-101. These signals enter the terminals AIN ~ DIN of IC-103 (DIN = "0", CIN = "0", BIN = "1", AIN = "0") and they also be applied to the pins 2 thru 5 of IC-105. With this GATE, there is available the level "1" at the terminal BIN out of four terminals AIN ~ DIN as described in para. "EXPLANATIONS OF DIGITAL IC CIRCUIT" and as a result there will be caused the level "1" at the pin 10 of IC-107E.

When any one of the APLD selector keys (1 ~ 9) is not depressed (i.e., when all of AIN ~ DIN are at the level "0"), the pin 10 of IC-107E becomes "0" level and there will be caused the level "1" at the pin 11 (strobe) of IC-103. As to the movement of IC-103 refer to the para. "BEHAVIOR OF COUNTER CIRCUIT"

That the output (IC-101 · IC-102) as a result of depressing the APLD selector key is at the level "1" or "0" is referred to as the voltage of about 4.5V or of about 0.1V. The rated power supply (Vcc) is of 5.5V ±0.5V, and the negative potential to be supplied to the APLD selector key is of −9V ~ −10V and this is decreaded to −4V when the key is depressed.

BINARY-TO-DECIMAL CONVERSION CIRCUIT

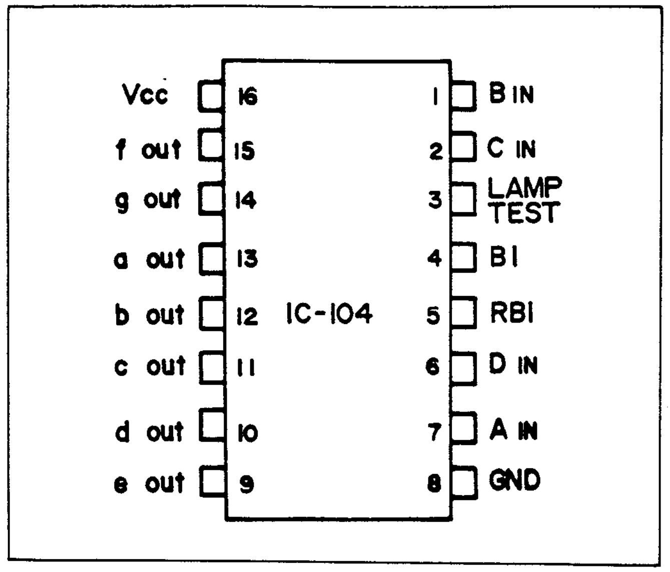


Figure 36

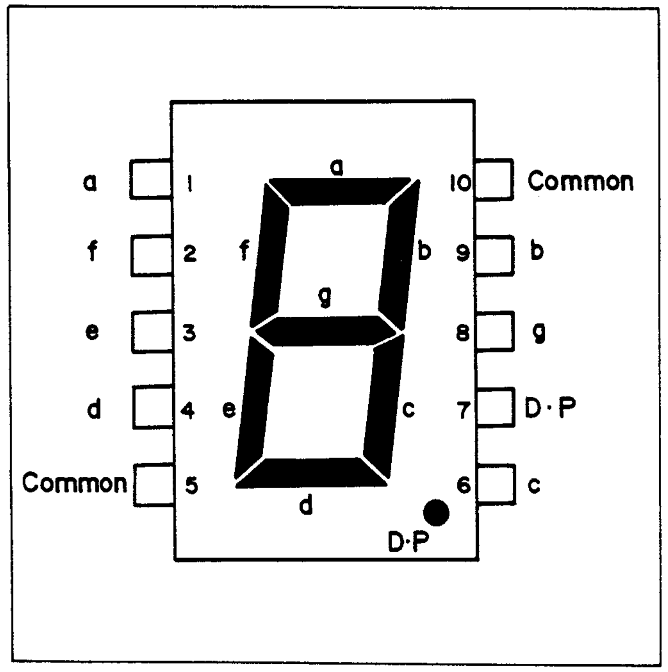


Figure 37

Signals caused at the terminals AOUT ~ DOUT of IC-103 are applied to BCD-to-seven-segment decoder/driver (IC-104). The IC-104 is to convert binary digit, i.e. either "1" or "0" to its equivalent decimal notation (1 ~ 9) to be used for the seven-segment LED (TLR301).

Fig. 36 represents the location of input/output terminals (the pins 1 ~ 16) of IC-104. This IC can function only when there arise inputs signals at the terminals AIN ~ DIN and the following conditions are satisfied at a time.

(1) GND (pin 8) is grounded.
(2) Vcc terminal (pin 16) is given 5V.
(3) BI terminal (pin 4) becomes "1" if any one of AIN ~ DIN has this value or it becomes "0" if all of AIN ~ DIN have this value (this is not to allow the display of the figure 0 at LED.)

Thus, the IC-104 creates output signals at the terminals a_{out} ~ g_{out}.

Lamp test terminal (pin 3) is a terminal to check whether all of the segments a ~ g of the seven-segment LED (TLR-301) can normally light up.

The lamp test terminal is usually kept to the level "1" or "Open" state. To make alive this terminal, it is always required that BI terminal (pin 4 of IC-104) is to be set to the level "1", i.e., it becomes "1" only if any one of AIN ~ DIN has this value as described before. On the contrary, when all of AIN ~ DIN are "0" since the BI terminal becomes "0", the seven-segment LED (TLR-301) can not light up-this makes it impossible to perform the lamp test.

With this lamp check, 8 binary coded decimals are required for 7 segments a ~ g. This check is also available by depressing the APLD (Refer to Fig. 37) selector key $\boxed{8}$.

Fig. 38 represents the truth table by which it can be known how the TLR301 (LED) becomes lit with signals given at the terminals AIN ~ DIN of IC-104. While Fig. 37 shows the location of each segment of TLR301 (LED).

For example, when the APLD selector key 2 is depressed, signal of 0010 is input to DIN ~ AIN of IC-104. Then, BI terminal (pin 4) of IC-104 becomes "1" level, and as to the terminals a_{out} ~ g_{out} (pins 9 ~ 15), the terminals c out and j out become "1" level while the terminals a_{out} b_{out} d_{out} and e_{out} et "0" level. Since there exists the INVERTER gate between the terminals a_{out} ~ g_{out} (pins 9 ~ 15) and LED, the inputs at each terminal of LED become reversed to the output at the terminals a ~ g of IC-104, i.e. the inputs a, b, d, e and g of LED become "1" level and the inputs c and j become "0" level. To know in what process the LED lights up when the APLD selector key $\boxed{1}$ or $\boxed{3}$ thru $\boxed{9}$ is depressed, refer to Fig. 38.

In the case of depressing the key $\boxed{2}$, the input of LED become like a = "1", b = "1", c = "0", d = "1", e = "1", f = "0" and g = "1", as a result of which the segments a ~ g of LED make the display of the character 2.

Besides, DP terminal (pin 7) of TLR301 is for the display of decimal point and it is not activated in usual case.

DECIMAL CORD	IC-104 INPUT				IC-104	IC-104 OUTPUT							LED INPUT							TLR 301 (LED)
	D IN	C IN	B IN	A IN	BI	a	b	c	d	e	f	g	a	b	c	d	e	f	g	
1	0	0	0	1	1	1	0	0	1	1	1	1	0	1	1	0	0	0	0	1
2	0	0	1	0	1	0	0	1	0	0	1	0	1	1	0	1	1	0	1	2
3	0	0	1	1	1	0	0	0	0	1	1	0	1	1	1	1	0	0	1	3
4	0	1	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	1	1	4
5	0	1	0	1	1	0	1	0	0	1	0	0	1	0	1	1	0	1	1	5
6	0	1	1	0	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	6
7	0	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	0	0	7
8	1	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	8
9	1	0	0	1	1	0	0	0	1	1	0	0	1	1	1	0	0	1	1	9
0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	

Figure 38

AUTOMATIC PROGRAM FINDER CIRCUIT

(Refer to Fig. 39 and 40)

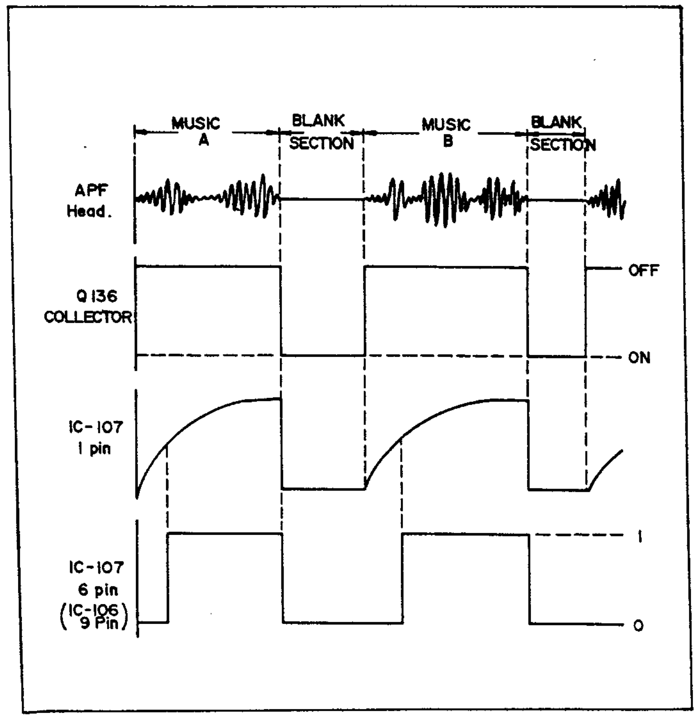


Figure 39

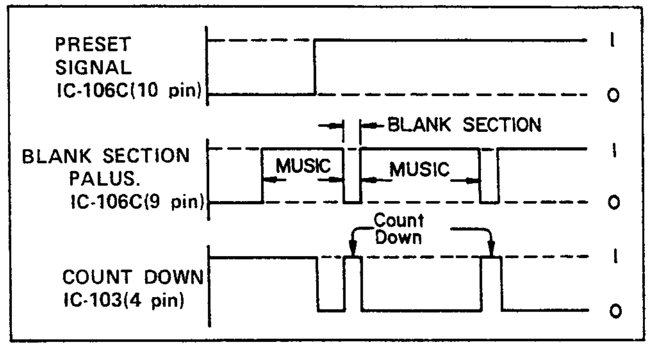


Figure 40

Signal which is detected by APF head on the tape is applied to the pin 9 of IC-106 via the corrector Q136 and R510. The corrector Q136 is kept to "0" level when the APF head detects a blank section while it is kept to "1" level when the head detects a music section. This, however, is a logical output of discrete circuit of which the voltage is different from that of IC circuit. Therefore the former voltage is made available also for IC circuit by the aid of the interface R510 and R511.

MUSIC SELECTOR CIRCUIT

The music selector circuit is to convert a decimal number 1 thru 9 to its 4-bit equivalent binary notation and to apply blank section pulse to the counter circuit which makes a tape be fast forwarded (or rewind) by the duration corresponding the APLD selector key depressed. This circuit consists of APLD selector keys (1 ~ 9) and each GATE of IC-101 and IC-102 as we have described in the para. "DECIMAL-TO-BINARY CONVERSION CIRCUIT." Also refer to "DIGITAL IC CIRCUIT."

CLEAR CIRCUIT (Refer to Fig. 41)

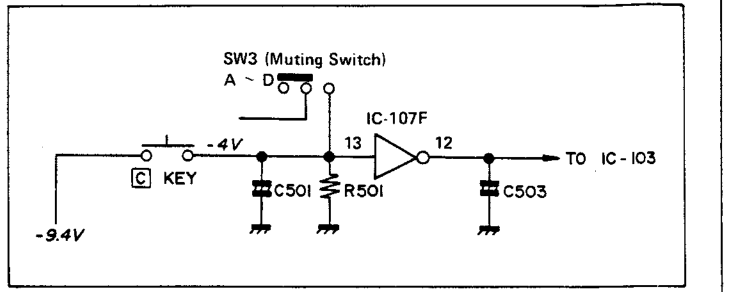


Figure 41

During the time in which the C key is not depressed, the pin 13 of IC-107F is at "1" level and thus the pin 12 of IC-107. becomes "0" level. As a result the pin 14 of IC-103 becomes "0" level and thus the operation is not cleared.

On the contrary, if the C key is depressed negative voltage of −4 Vis applied to the terminal 13 of IC-107F to make it be at "0" level and then the pin 12 of IC-103 becomes "1" level. As a result the pin 14 of IC-103 gets in "1" level so that the operation will be cleared.

According to Fig. 41, it can be seen that R501 and C501 are connected to the pin 13 of IC-107F and C503 to the pin 12 of IC-107F.

The said R501 and C501 are to forcibly clear the counter IC (IC-103) for a moment when the power switch is turned on, assuring of the output of 0000. This is because that, without such R501 and C501, the flip-flop inside the counter IC functions to create abnormal output when the power switch is turned on. As a result of the function of R501 and C501, as soon as the power switch is turned on the potential at the pin 13 of IC-107F is once decreased to "0" level and then increased to the threshold level, resulting in that the output of IC-103 then caused becomes always the level "0000".

The C503 which is connected to pin 12 of IC-107F is to absorve noises like switch noise, etc.

The muting switch SW3 (A ~ D) is to become useful in only the mode STOP, FF and REW.

In other modes (REC and PLAY), the muting switch SW3 is make turned on by the interlocking with the sub chassis of the mechanism so that the pin 12 of IC-107F becomes "0" level.

CLOCK PULSE GENERATOR CIRCUIT

As long as none of the APLD selector keys (1 ~ 9) is depressed, the terminals AOUT ~ DOUT of IC-103 are kept to "0000". If any of the keys is depressed, either of the terminals AOUT ~ DOUT becomes "1". Fig. 42 represents a pre-set circuit for clock pulse generation. The broken-lined portion shows circuit which is supposed to be made up by the combination of strobe generator circuit (Fig. 32) and INVERTER gate. The related outputs are expressed as follows by Boolean algebra;

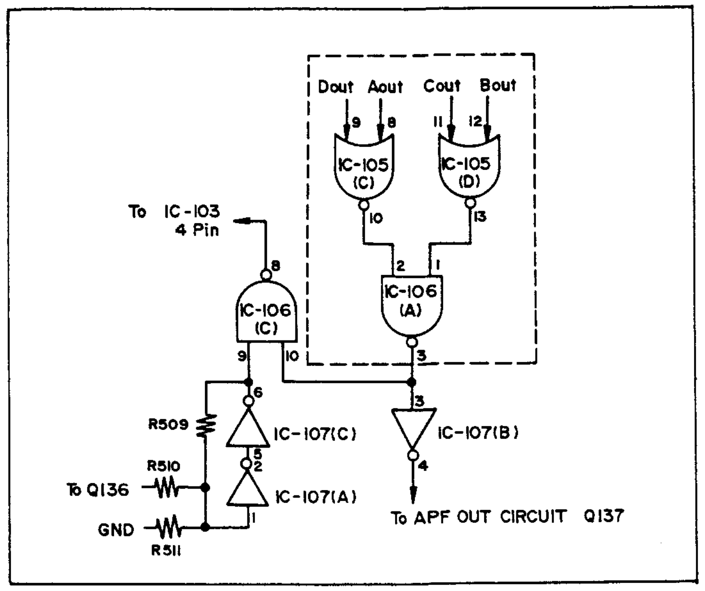


Figure 42

$$\overline{\overline{(D + A)} \cdot \overline{(C + B)}} = \overline{\overline{(D + A) \cdot (C + B)}} = D + A + C + B$$

$$= A + B + C + D.$$

From the above it can be understood that the output becomes "0" only if all of the inputs have this value, but is "1" if any one of the inputs is "1".

Therefore, if any one of the inputs A, B, C and D shown by broken lines in Fig. 42 is "1", the output of IC-106A (pin 3) becomes "1", but is "0" only when all of these inputs have this value.

As said in "AUTOMATIC PROGRAM FINDER CIRCUIT" R510 and R511 are used as an interface to make the level of clock pulse be the same for both the discrete circuit and IC circuit. The clock pulse which is detected by the automatic program finder circuit is corrected in shape by IC-107 A and IC-107 C and R509 so that it may be available for the input of IC circuit; it is called Schmidt circuit.

With this Schmidt circuit, there are two INVERTER gates between IC-107A (pin 1) and IC-107C (pin 6). Therefore, when the input of IC-107A (pin 1) is "1" the output of IC 107C (pin 6) becomes "1" and on the contrary when the input is "0" the output becomes "0". When the clock pulse a music section, the output becomes "1" and when the circuit detects a blank section, the output becomes "0". Since the IC-106C is of NAND gate see the truth table Fig. 29 which shows NAND gate operation. According to this truth table it can be understood that the output becomes "1" either when any one of the inputs A and B is "1" or when both of these inputs have the value "0". In Fig. Y, it is assumed that there are now caused preset signals at the input terminals of IC-105D and IC-105C.

This preset signals rises to "1" from "0" level. When the FF key or REW key is depressed, the signal becomes "1" when the APF head detects a music section while it becomes "0" when the head finds a blank section. As to NAND gate operation of IC-106C, its output is available only when the preset signal has been applied. And count-down signal is produced only when the APF head detects blank section. With the generation of count-down signal, the count-down operation is performed step by step to reach "0000". Then the tape travel is made automatically stop by the aid of APF output circuit together with IC-107 B.

We have explained in "CLOCK PULSE GENERATOR CIRCUIT" that the terminals DOUT ~ AOUT of IC-103 become "0000". In this connection, as to the outputs shown by the broken lines in Fig. 42 it can be said that the output becomes "0" only when all of the inputs are "0". Accordingly, the pin 3 of IC-106A becomes "0" and there arises the signal of "1" at IC-107B, resulting in that count-down termination pulse is generated to perform auto stop operation.

However, this auto stop operation is not performed when there is no preset signal or when the unit is in REC or PLAY mode.

APF OUTPUT CIRCUIT (Refer to Fig. 43)

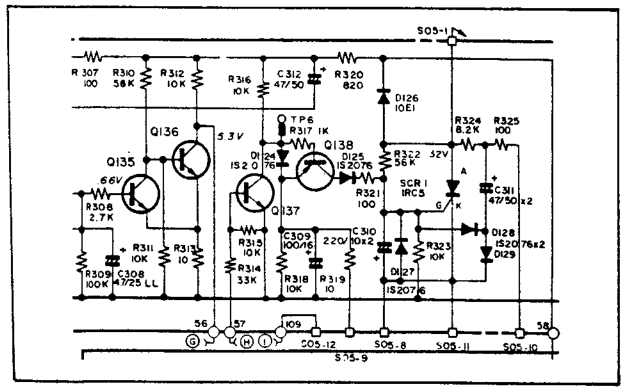


Figure 43

The output at the pin 4 of IC-107B is kept to "1" when there is no preset signal. At the time the potential is about 4V. When it is given to the base of Q137, the Q137 is turned on and its collector potential becomes 0V. With the Q137 turned, C309 becomes not charged and thus Q138 is turned off and SCR-1 is turned off.

On the contray, when there is given preset signal, 0V is supplied to the base of Q137 and the Q137 is turned off, resulting in power supply of 3V to C309 via R316 and D124 and thus C309 begins to be charged. This is the condition which allow input signals to enter the Gate (G) of SCR-1.

Along with the count-down operation, the preset signal is changed to "1" from "0" level and Q137 is turned on and since C309 is discharged there will be caused a base current at the base-to-emitter junction of Q138.

Simultaneously a collector current is applied to the gate (G) of SCR-1 and the SCR-1 is turned on to perform auto stop operation. From the above it can be said that the count-down termination depends upon the C309.

SPACE PAUSE CIRCUIT (Refer to Fig. 44)

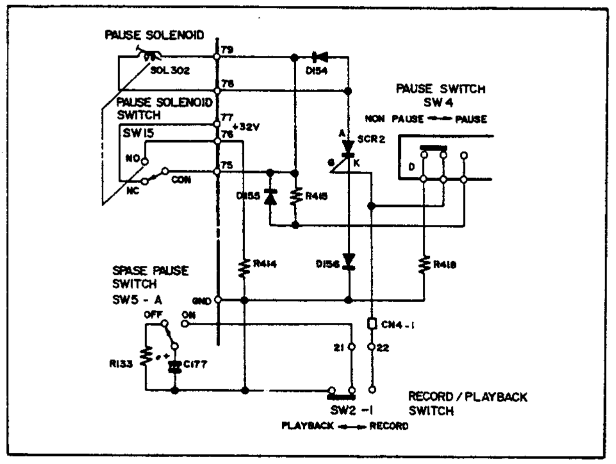


Figure 44

The space pause circuit provides such a function as: when the pause button is depressed in record mode, input signals are automatically subjected to muting condition for about 4 seconds and then the solenoid (SOL302) is activated to make the unit be in pause mode.

Circuit Description:

The space pause circuit is usually powered by a voltage supply of +32V. When the pause button is depressed in record mode, the pause switch (SW4) is turned on, the gate terminal voltage of silicon controlled rectifier (SCR2) is gradually increased by the resistor (R415) and capacitor (C177) which are located at the gate circuit of silicon controlled rectifier (SCR2) and in about 4 seconds thereafter, the junction between the anode terminal and cathode terminal of silicon controlled rectifier (SCR2) becomes conductive. As a result, a current runs in the solenoid (SOL302) to be attracted and then the pause solenoid switch (SW15) is turned off causing no current to run in the pause solenoid (SOL302). Thus, the unit is put in pause mode. When the pause switch (SW4) is being turned on (pause mode), the input side of record amplifier is connected to the earth, causing no signal to run in the record/play back head . . . no recording is made.

TROUBLE SHOOTING FOR APLD

Prior to starting the work, check for power supply voltage. It is so designed that various IC's can normally operate on the power supply of about 4V to 7V.

With the power supply outside the above specification, there may be caused troubles that the threshold level varies and/or IC itself can't operate; IC may probably be broken if the power supply exceeds the upper limit 7V.

Power supply for the IC circuit is set to about 5.5V ±0.5V by power regulator circuit. Check whether the power supply satisfies this value.

Check 1: Check for the power ssupply (Using a Tester)

→1	Power supply PWB	F0505AF	Lead No.: 65 (+), 60 (–) (or chassis)	5.5V ±0.5V
→2	Power supply PWB	F0505AF	Lead No.: 58(+), 59 (–) (or chassis)	32V ±2V
→3	APL control PWB	E0063AF	Lead No.: 65 (+), 66 (–) (or chassis)	5.5V ±0.5V
		E0063AF	IC101, 102, 105 106, 107, 108	5.5V ±0.5V
		E0063AF	IC-103, 104 (16P, 8P)	5.5V ±0.5V
		E0063AF	Lead No. 60 (or chassis), 110	–9V ±1V
→4	APL keyboard	E0064AF	SO7, 5P, 4P	–9V ±1V
→5	Oscillation PWB	F0464AF	Lead No. 58, (+) chassis (–)	32V ±2V

Trouble-wise Checks

LED (TLR-301) can't light up even if APLD selector key is depressed:

→ 6 (1) APLD selector KEY (keyboard) is in trouble.
→ 7 (2) Encoder is in trouble. Check IC 101 and IC 102.

Check 2: Counter is always in "clear" condition.
→ 8 (1) Clear circuit is in trouble. Check IC 107.
→ 9 (2) Auto clear circuit (muting switch; SW3 (D)) is in trouble.

Check 3: There is no signal at AOUT ~ DOUT of IC-103:
→ 10 (1) Strobe pulse generator circuit is in trouble. Check IC 105, (A), (B), IC 106(B) and IC 107(E).
→ 11 (2) There is no output of the counter. Check IC 103.

Check 4: Display circuit (IC-104) can not operate normally.
→ 12 (1) Allow the display of the figure 0 at LED (BI) is in trouble. Check IC 105(C), (D), and IC 106(A).
→ 13 (2) BCD-To-Seven-Segment Decorder/Driver is in trouble. Check IC 105 (C), (D), and IC 106 (A).
→ 14 (3) Inverter is in trouble. Check IC 108 and IC 107D.
→ 15 (4) Seven Segment LED is in trouble. Check TLR 301 (LED).

Only a particular figure is not displayed or an erroneous figure lights up; but the display of other figures is normal.

Check 5: Check for the sections indicated by the above marks → 6, → 7, → 11, → 13, → 14 and → 15. Pay attention to the check in the section → 9, in particular as this section is most attributable to this trouble.

Besides, it seems that the digital IC seldom gets in trouble but its possible causes, if it should occur, may be attributable to such defects as of PWB wire breakage, other lead breakage, insufficient soldering and connector contact. Check for the connection and voltage related to various IC's.

This trouble is attributable mainly to the two reasons; (1) APF is in trouble and (2) APLD counter is in trouble. However this should be excepted from the defects which may be caused by the use of an inferior music tape. Make the check by using noiseless quality tape. (Refer to Fig. 59)

Firstly, try to know which trouble is attributable in the following way.

(1) Remove the lead No. 56 (soldered lead) from OSC PWB (F0464AF).
(2) Apply DC 5V ±1V to the lead thus removed and then make the connection as follows.
(3) Depress the APLD Selector KEY, for example, 9 (other buttons are also allowable) and make sure the figure 9 appears at the LED (TLR301).
(4) Turn ON the switch (at the time the figure 9 is kept in display) and next turn OFF the switch to make sure the display becomes 8. Repeat it to make sure the display figure is deducted 1 by 1 each time the switch is turned OFF. It is recommeded to make this ON-OFF interval be 1 sec. The operation of turning on and OFF the switch is referred to as meaning that program-to-program finder pulse is applied to the pin 56 of APLD PWB. (E0063AF).
    A) When count-down operation is normally performed with the operation of turning ON or OFF the switch, it means that there has been caused a trouble related APF section (F0464AF).
    B) When count-down operation is not performed under the above condition, it means that there has been caused a trouble related to APLD section. (E0063AF).

Count-down operation can not be performed even when the unit is put in FF or REW mode with a music tape.

Check 6: APF Output circuit of APF mechanism can not operate normally.

→ 16 (1) AC amplifier is in trouble. Check Q133 and Q134.

→ 17 (2) A-D converter circuit is in trouble. Check Q135 and Q136.

Check 7: Clock pulse is not applied to the counter (IC-103, 4 pin).

→ 18 (1) Clock pulse generator circuit is in trouble. Check IC-107 (A), (C) and IC 106 (C).

→ 19 (2) Counter is in trouble. Check IC-103.

Further check for the individual sections in which troubles have probably been caused, referring to the following descriptions.

Check 8: APF Output circuit of APF section is in trouble:

→20. Replace the lead No. 56 of OSC PWB (F0464AF) which has been removed in the above step, to the original place. Under this condition, prepare a music tape (its program-to-program interval should be more than 3 seconds and if possible, it is more preferable to make the interval be 1 minute or more. and let it run in FF or REW mode. (At the time it is not necessary to depress the program selector key.) Apply a tester to the said lead No. 56 and TPG measure the voltage in DC 10V range. If it is assumed that this finder circuit of APF section is not in trouble, the measured voltage becomes as follows; it is +5V for a music section and 0V for the program-to-program section.

→21. Check whether the output of AC amplifier is normal.
Make a music tape run in FF or REW mode and measure the voltage by using V.T.V.M.
It is to be in the range of 0.35V to 1V for a music section and it be less than 0.2V for the program-to-program interval.
If the measured voltage is normal it is referred to as meaning that DC amplifier (Q135, Q136) is in trouble. When it is outside the specification it is referred to as meaning that AC amplifier (Q133, Q134) and the APF head are in trouble.
In case the APF section is in trouble, the causes may be as follows: (1) The head output is insufficient or the tape travel mechanism is defective. (2) AC amplifier, (Q133, Q134) creates too large noise so that the output of TP5 can not drop to 0.2V or less oven for the program-to-program interval: In this case it is allowable to increase the value (33P) of C303 up to 100P.

NOTE: In the case of measuring the voltage of TP5, be sure not to allow the connection lead come too near the head amplifier (Q133 ~ Q136) as otherwise the noise further will develop.

Check 9: APLD section is in trouble (i.e., no clock pulse is applied to the counter IC-103).

→22. Check whether clock pulse is applied to the input terminal of the counter (IC-103). For the same circuit which has been used for checking for the APF and APL section as said before (Check 7), depress the APLD selector key to make sure the display (TLR301) is normal. Under this condition, if the check switch is turned ON, it results in that the voltage at the pin 4 of IC 103 is "0" (i.e., about 0.1V). And if the check switch is turned OFF, the voltage becomes "1" (i.e., about 4.2V). As seem from the above if the voltage is changed

("1" to "0" or vice versa), this is referred to as meaning that IC 103 is in trouble.

NOTE: This check is to be performed only under the condition that any of the APLD selector KEY has been depressed to keep on the display.

On the contrary, if the voltage at the pin 4 of IC 103 is not changed even when the check switch is turned ON and OFF alternatively, further check the following:

(1) When the voltage at the IC-103 (pin 4) remains 4.2V:
    Make sure the voltage at the pin 10 of IC 106C is normal. Then depress the check switch to see whether the voltage becomes "1" (4.8V) and release the switch to check whether it becomes "0" (0.1V).
    If this check is not satisfied, it is referred to as meaning that a program is not normally preset even when the related selector key is depressed. On the other hand, if the check is satisfied, it is to mean that the clock pulse generator circuit (IC 107(A), (C)) is in trouble.
    Note: In this check, however, it is also considerable that the said voltage remains 1.5V. This is referred to as meaning that there is caused connection breakage between IC 106C (8 pin) and IC 103 (4 pin).
(2) When the voltage at the pin 4 remains 0V:
    Besides making the check (1) above, check for the voltage at the pin 9 of IC 106C; it becomes "1" (about 4V) when the check switch is turned ON while "0" (about 0.1V) when the switch is turned OFF.
    If the above measurement is satisfied, it shows that the clock pulse generator circuit (IC 107A, C) is in trouble and if not satisfied, it means that IC 106C is in trouble.

→ 23. Clock pulse generator circuit is in trouble:
With the same circuit as in the check → 22, turn OFF the check switch and check for the voltage at each pin of IC 107A and C as follows;

IC 107C, pin 1 : 4.2V
pin 2 and pin 5 : 4.2V
pin 6 : 0.1V

Then turn ON the check switch.

IC 107C, pin 1 : 3V
pin 2 and pin 5 : 0.1V
pin 6 : 4V

Again turn OFF the switch and make sure that the voltage state returns as assured when the switch has been turned OFF for the first time. This means that IC 107 is normal. However, if the voltage 4V at the pin 6 of IC 107C can not drop to 0,1V with the turning OFF of the switch re-check it by increasing the value 1.5K of R509 to 2.7K. If the recheck is not yet satisfactory, this leads in a conclusion that IC 107 is in trouble.
From the above, it can be summarized that: if the count-down operation is not performed even when the preset function of program is normal and the generation of blank section pulse is also normal, this is caused mostly because the clock pulse generator circuit is in trouble.

Auto stop mechanism can not function even when the count-down operation is finished:

Check 10: APF output circuit can not function normally.

→ 24. APF output circuit is in trouble.
C Q137, Q138, SCR1 and APLD switch (SW16)

Check 11: APLD output circuit can not function normally

→25. Count-down termination pulse is not produced. Check IC 107B.

This trouble may probably be attributable to the followin two sorts of defect, i.e., at APF section or at APLD section Firstly try to find of which section is connected to th trouble, in the following steps. (Refer to Fig. 60)

(1) Remove the lead No. 57 (soldered) of OSC PWB.
(2) Apply DC 5V ± 1.0V to the lead No. 57 thus remove and make the connection as follows.
(3) Make the unit be in FF mode.
(4) Change over the switch from "OFF" position to "ON" position. ("OFF" setting time should be at least seconds.)
    At the time, if auto stop operation is performed it mean APF output section is normal but if it is not performe it means APF output section is in trouble.

→ 26. APF output circuit is in trouble.
    (1) Check for the voltage of each part of th output circuit.
    (2) Check whether SC R-1 is normal. Otherwis the full-auto stop circuit may not functio
    (3) Make sure D125 is not open.

(4) Check whether SW16 can operate normally (check for the voltage of C309).

→ 27. APLD output circuit is in trouble.

(1) Check whether the output at the pin 4 of IC 107B is normal.
Depress APLD selector key to make sure the said output becomes "0" (0.1V) and release the key to make sure it becomes "1" (4.2V). If this is satisfied it means APF output circuit is normal but APLD circuit is in trouble.

(2) If the above voltage check is not satisfied, further check for the voltage at the pin 3 of IC 107B. Depress APLD selector key to make sure the said voltage becomes "1" level (about 4.8V) and then release the key to make sure it becomes "0" level (about 0.1V).

(3) It is a theory that when the voltage at the pin 3 of IC 106A has already be abnormal no display is caused even if APLD selector key is depressed. In this case, make the check according to "NO DISPLAY IS PERFORMED."
In the above check, if there arises only 1.5V for "1" level it means that a wire breakage is caused between IC 107B (pin 3) and IC 106A (pin 3). And if the output is found abnormal concerning the voltage at the pin 3 of IC 107B, it shows that IC 107B is in trouble.

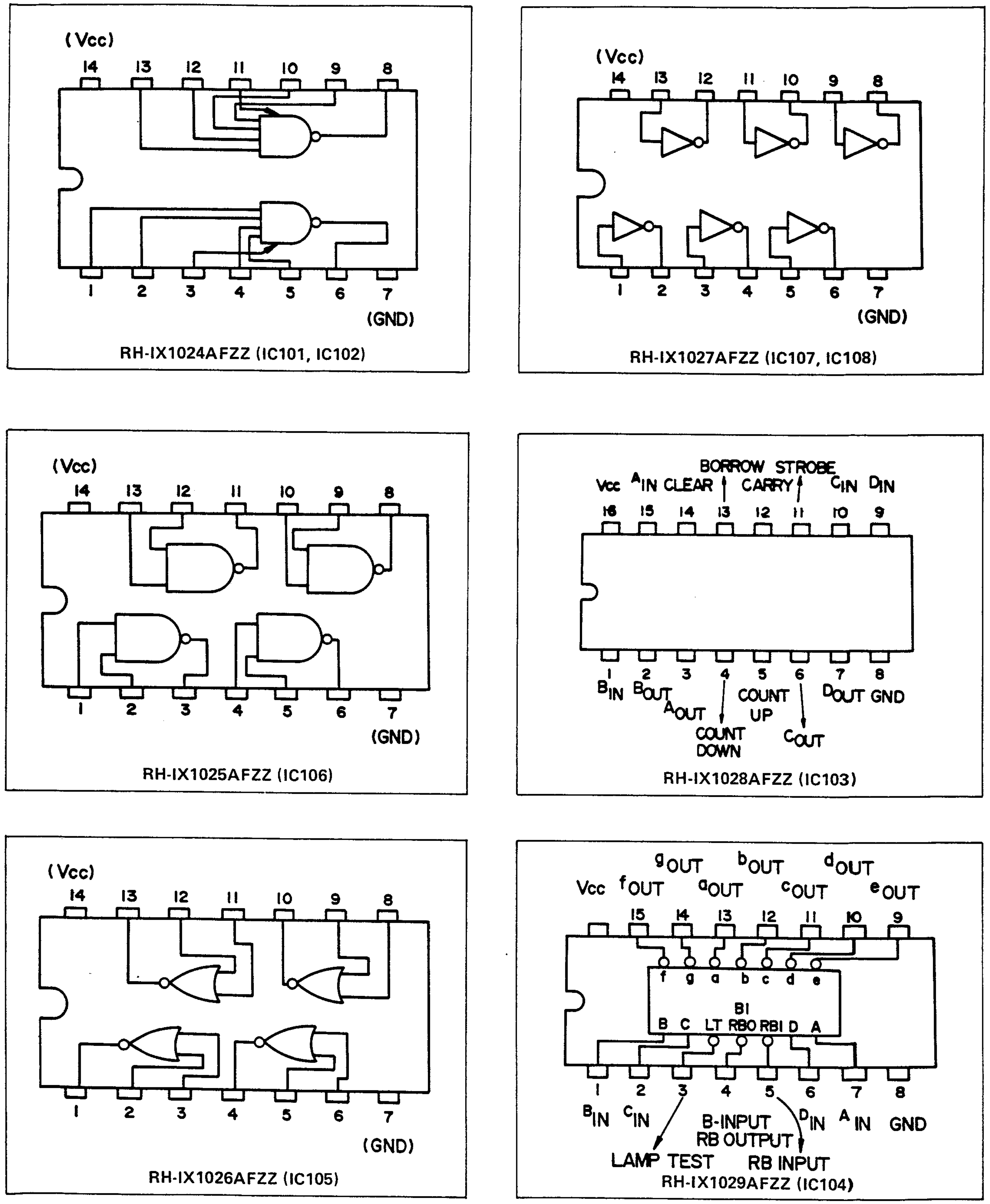

(Vcc)
14 13 12 11 10 9 8
1 2 3 4 5 6 7
(GND)
RH-IX1024AFZZ (IC101, IC102)
RH-IX1027AFZZ (IC107, IC108)
RH-IX1025AFZZ (IC106)
Vcc
A IN
CLEAR
BORROW
STROBE
CARRY
C IN
D IN
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
B IN
B OUT
A OUT
COUNT DOWN
COUNT UP
C OUT
D OUT
GND
RH-IX1028AFZZ (IC103)
RH-IX1026AFZZ (IC105)
g OUT
b OUT
d OUT
f OUT
a OUT
c OUT
e OUT
15 14 13 12 11 10 9
f g a b c d e
BI
B C LT RBO RBI D A
B IN
C IN
B-INPUT
RB OUTPUT
D IN
A IN
LAMP TEST
RB INPUT
RH-IX1029AFZZ (IC104)

Figure 45 TOP VIEW OF IC (IC104 ~ IC108)

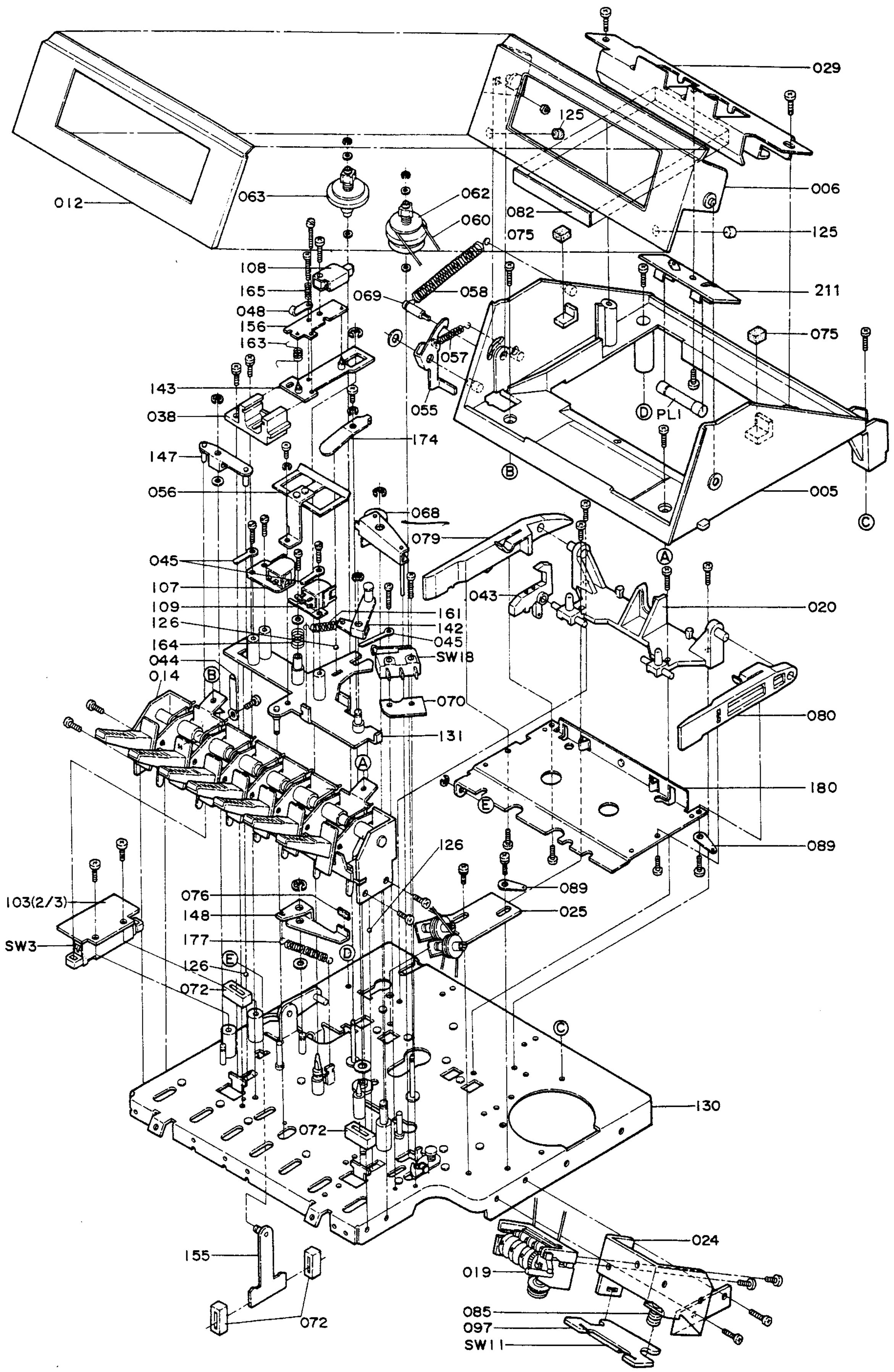

029
125
006
012
063
062
060
082
075
125
211
108
165
048
156
163
069
058
057
055
075
143
038
147
174
PL1
B
005
C
056
068
079
045
107
109
126
164
044
014
B
161
142
045
SW18
043
020
A
070
080
131
A
180
E
089
126
076
148
177
D
089
025
103(2/3)
SW3
126
E
072
C
072
130
155
072
024
019
085
097
SW11

Figure 46 MECHANISM EXPLODED TOP VIEW

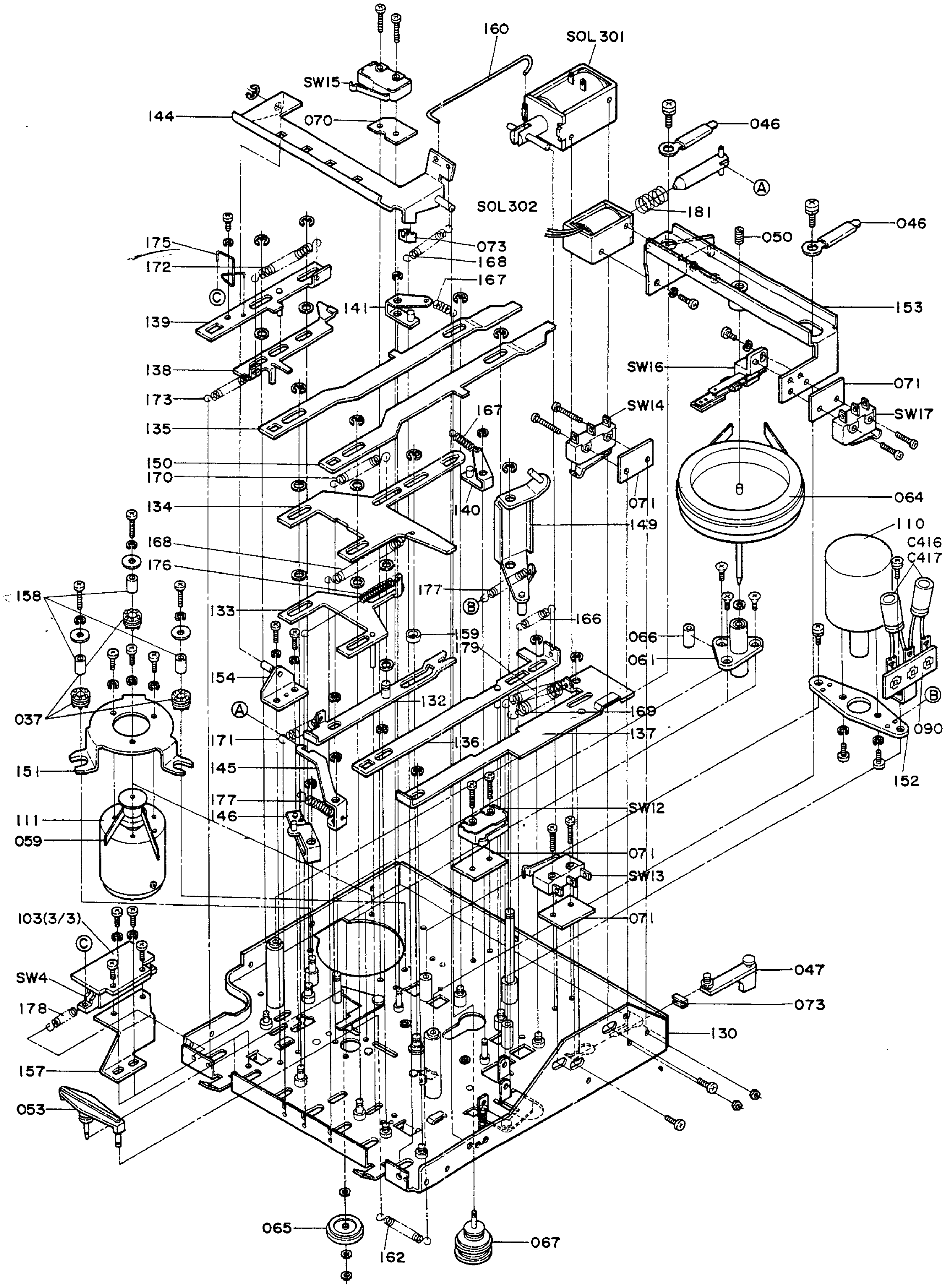

160
SOL 301
SW15
144
070
046
A
046
175
172
C
SOL302
073
168
167
181
050
139
141
153
138
173
135
SW16
071
SW17
SW14
167
150
170
140
071
064
134
149
110
C416
C417
168
176
158
177
B
166
133
159
179
066
061
154
132
A
037
169
136
171
137
090
B
151
145
152
177
146
111
SW12
059
071
SW13
103(3/3)
C
071
SW4
047
178
073
130
157
053
065
162
067

Figure 47 MECHANISM EXPLODED BOTTOM VIEW

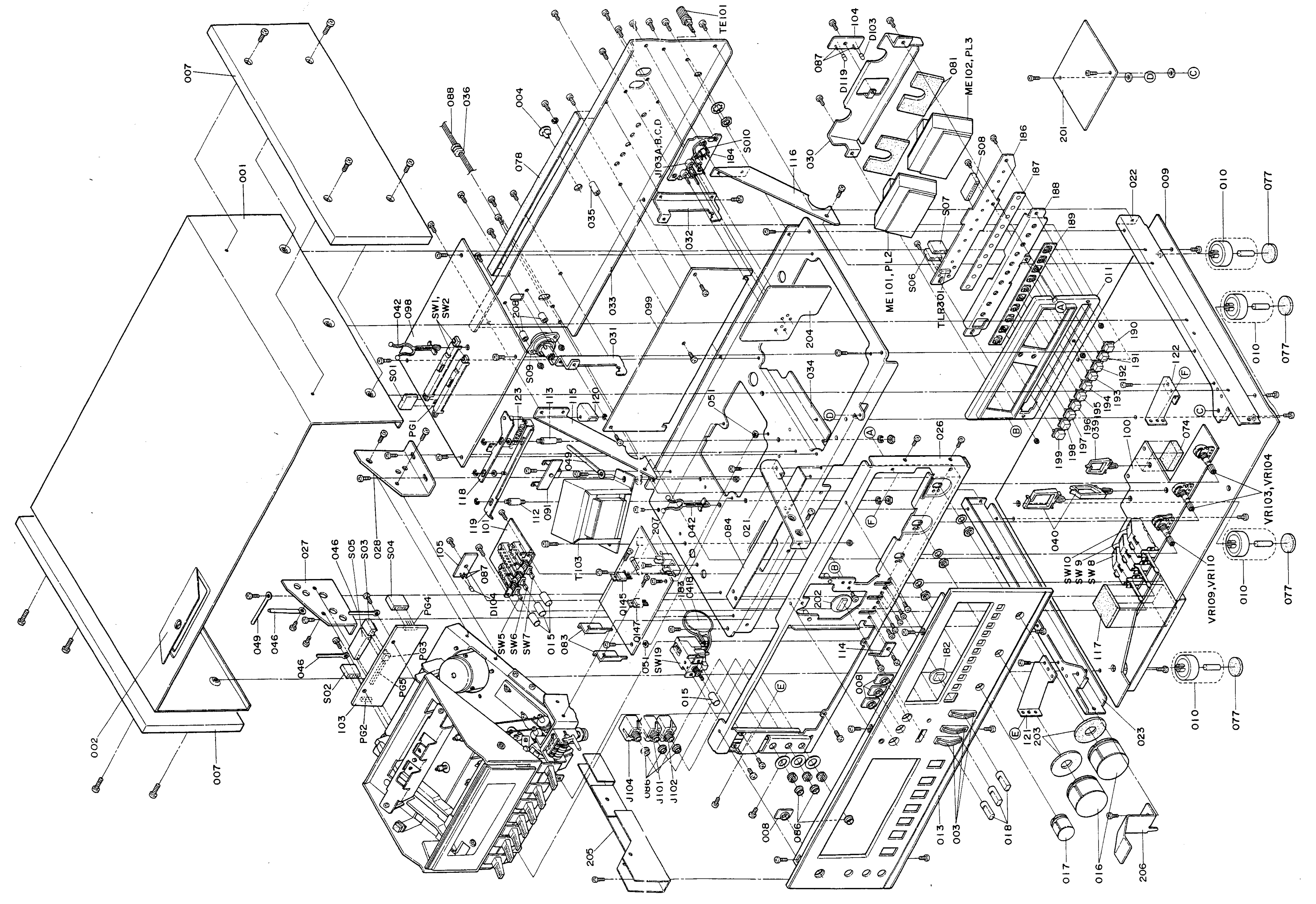

007
001
002
007
088
036
004
078
035
042
098
SW1, SW2
S01
PG1
208
S09
031
033
099
032
J103A,B,C,D
184
S010
116
TE101
104
D103
087
D119
030
081
ME102, PL3
ME101, PL2
S08
S07
S06
TLR301
186
187
188
189
011
201
D
C
022
009
010
077
204
034
051
D
A
123
113
115
120
118
119
101
112
091
049
T103
207
042
084
021
026
F
B
190
191
192
193
194
195
196
039
197
198
199
122
F
C
100
074
040
VR103, VR104
SW10
SW9
SW8
VR109, VR110
117
027
046
S05
S03
028
S04
105
087
D104
SW5
SW6
SW7
015
083
Q145
Q147
183
Q418
051
SW19
049
046
PG4
PG3
PG5
S02
103
PG2
015
E
205
J104
086
J101
J102
008
114
202
B
182
008
086
013
003
018
017
016
206
121
E
203
023

Figure 48 CABINET EXPLODED VIEW

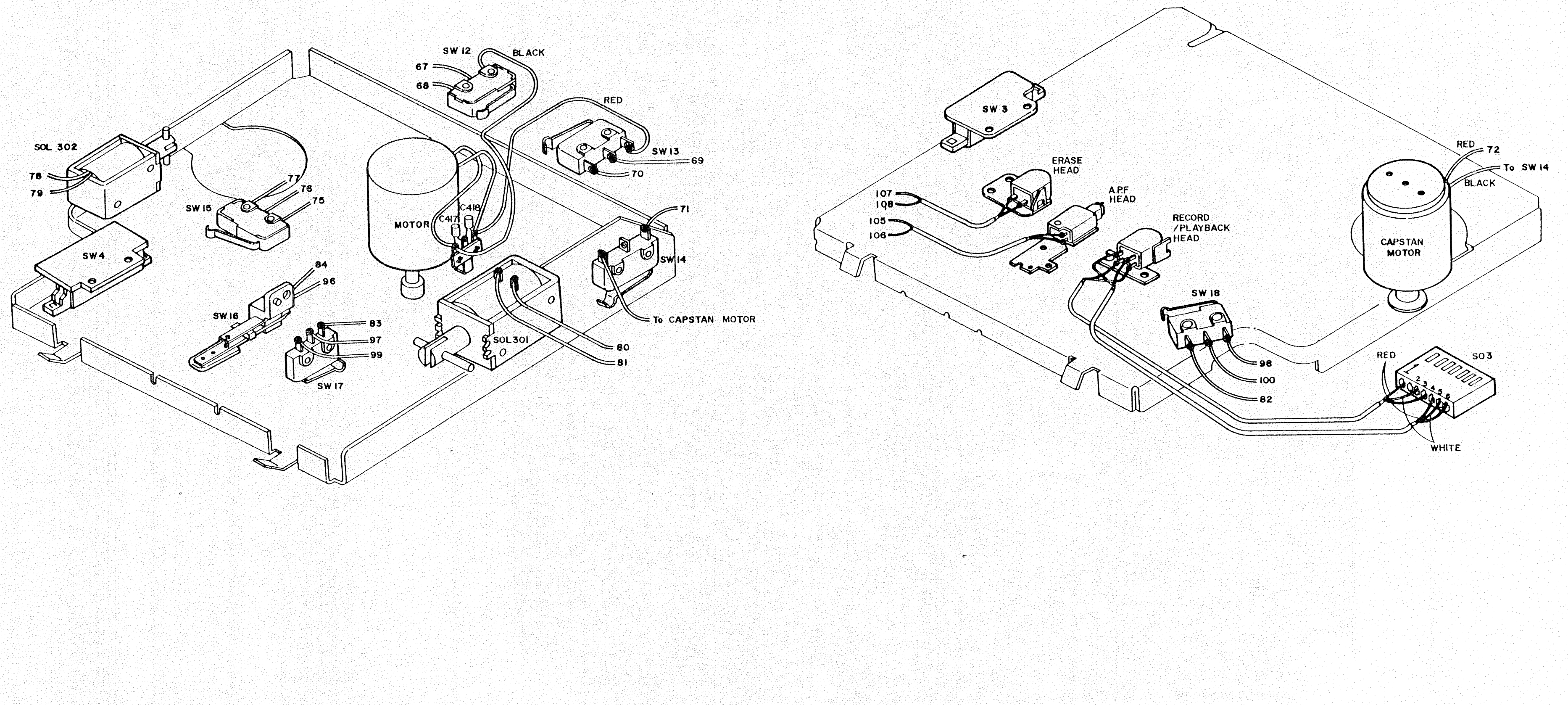

SOL 302
78
79
SW4
SW15
77
76
75
SW12
BLACK
67
68
RED
SW13
69
70
MOTOR
C418
C417
71
SW14
To CAPSTAN MOTOR
SW16
84
96
83
97
99
SW17
SOL 301
80
81
SW 3
ERASE HEAD
APF HEAD
RECORD /PLAYBACK HEAD
107
108
105
106
RED
72
To SW 14
BLACK
CAPSTAN MOTOR
SW 18
98
100
82
RED
SO3
WHITE

Figure 49 WIRING SIDE OF MECHANISM BLOCK

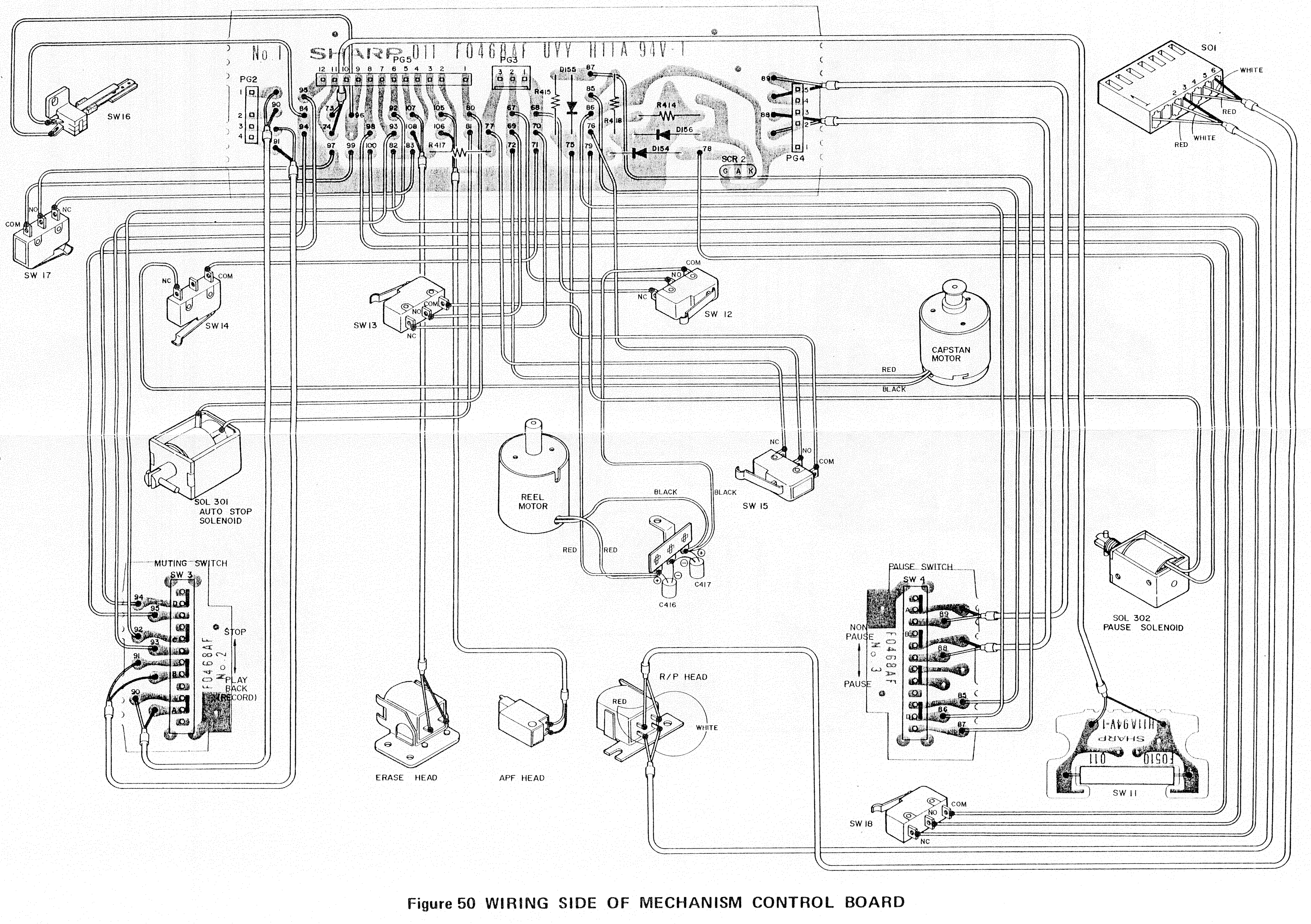

No. 1
SHARP 011 F0468AF UYY H11A 94V-1
PG2
PG5
PG3
PG4
SW16
D155
R415
R418
R414
D156
D154
SCR 2
G A K
R417
SOI
WHITE
RED
WHITE
RED
SW 17
COM
NO
NC
SW14
SW13
SW 12
CAPSTAN MOTOR
RED
BLACK
SOL 301 AUTO STOP SOLENOID
REEL MOTOR
BLACK
BLACK
SW 15
RED
RED
C416
C417
MUTING SWITCH
SW 3
STOP
PLAY BACK (RECORD)
F0468AF No. 2
ERASE HEAD
APF HEAD
R/P HEAD
RED
WHITE
PAUSE SWITCH
SW 4
NON PAUSE
PAUSE
F0468AF No. 3
SOL 302 PAUSE SOLENOID
SHARP H11A94V-1
011 F0510
SW 11
SW 18

Figure 50 WIRING SIDE OF MECHANISM CONTROL BOARD

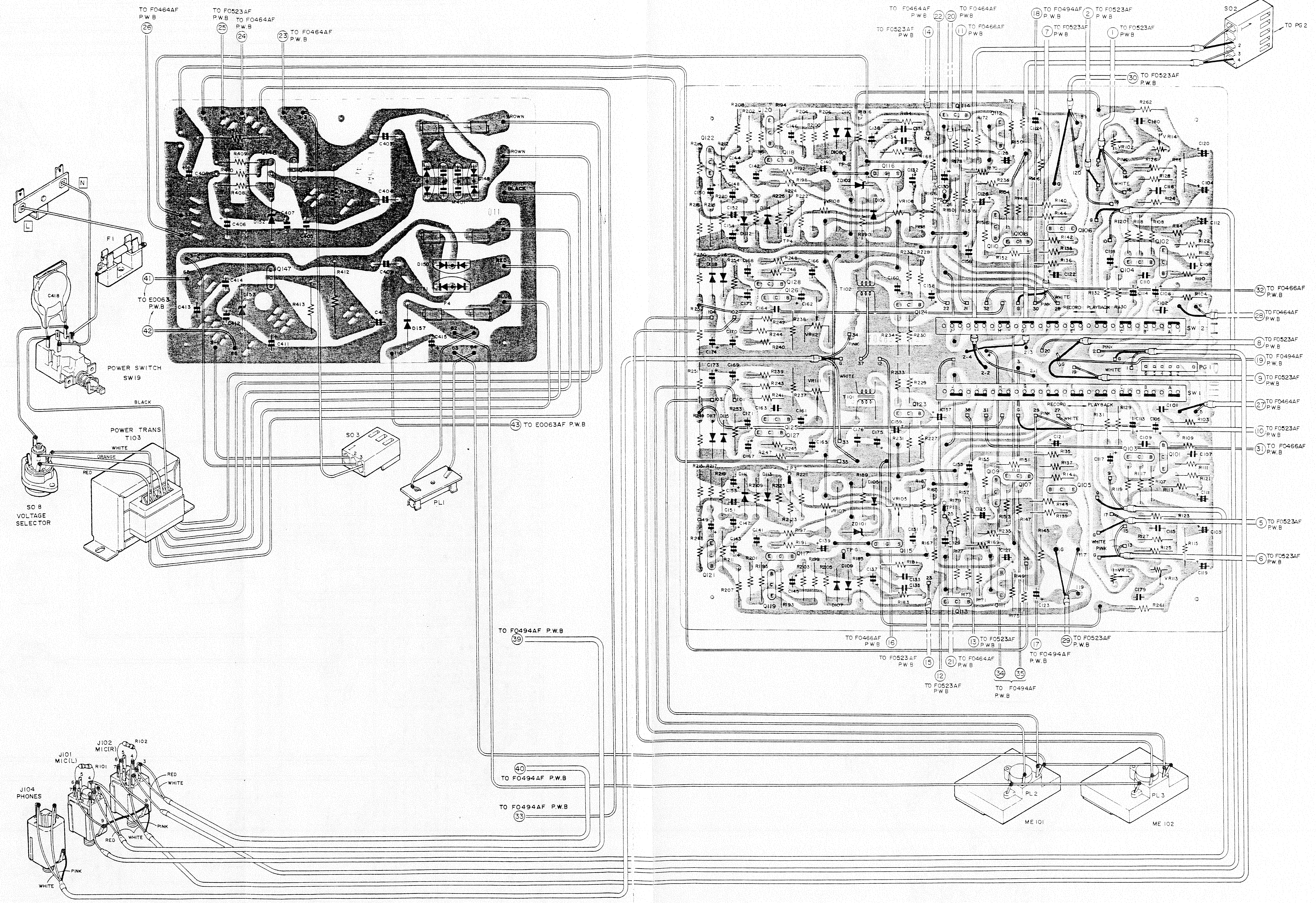

TO F0464AF P.W.B 26
TO F0523AF P.W.B 25
TO F0464AF P.W.B 24
TO F0464AF P.W.B 23
41 TO E0063 P.W.B 42
POWER SWITCH SW19
POWER TRANS T103
SO 8 VOLTAGE SELECTOR
F1
C418
BLACK
WHITE
ORANGE
RED
BROWN
BLUE
SO 3
PL1
43 TO E0063AF P.W.B
TO F0494AF P.W.B 39
40 TO F0494AF P.W.B
TO F0494AF P.W.B 33
J101 MIC(L)
J102 MIC(R)
J104 PHONES
R101
R102
PINK
SO2
TO PG 2
30 TO F0523AF P.W.B
32 TO F0466AF P.W.B
28 TO F0464AF P.W.B
8 TO F0523AF P.W.B
19 TO F0494AF P.W.B
9 TO F0523AF P.W.B
27 TO F0464AF P.W.B
10 TO F0523AF P.W.B
31 TO F0466AF P.W.B
5 TO F0523AF P.W.B
6 TO F0523AF P.W.B
TO F0466AF P.W.B 16
TO F0523AF P.W.B 15
12 TO F0523AF P.W.B
21 TO F0464AF P.W.B
13 TO F0523AF P.W.B
34 35 TO F0494AF P.W.B
17 TO F0494AF P.W.B
29 TO F0523AF P.W.B
TO F0464AF P.W.B 22 20
TO F0523AF P.W.B 14
11 TO F0466AF P.W.B
18 TO F0494AF P.W.B
2 TO F0523AF P.W.B
7 TO F0523AF P.W.B
1 TO F0523AF P.W.B
SW 2
SW 1
PG 1
RECORD PLAYBACK
PL 2
PL 3
ME 101
ME 102

Figure 51 WIRING SIDE OF RECORD/PLAYBACK AMP. BOARD

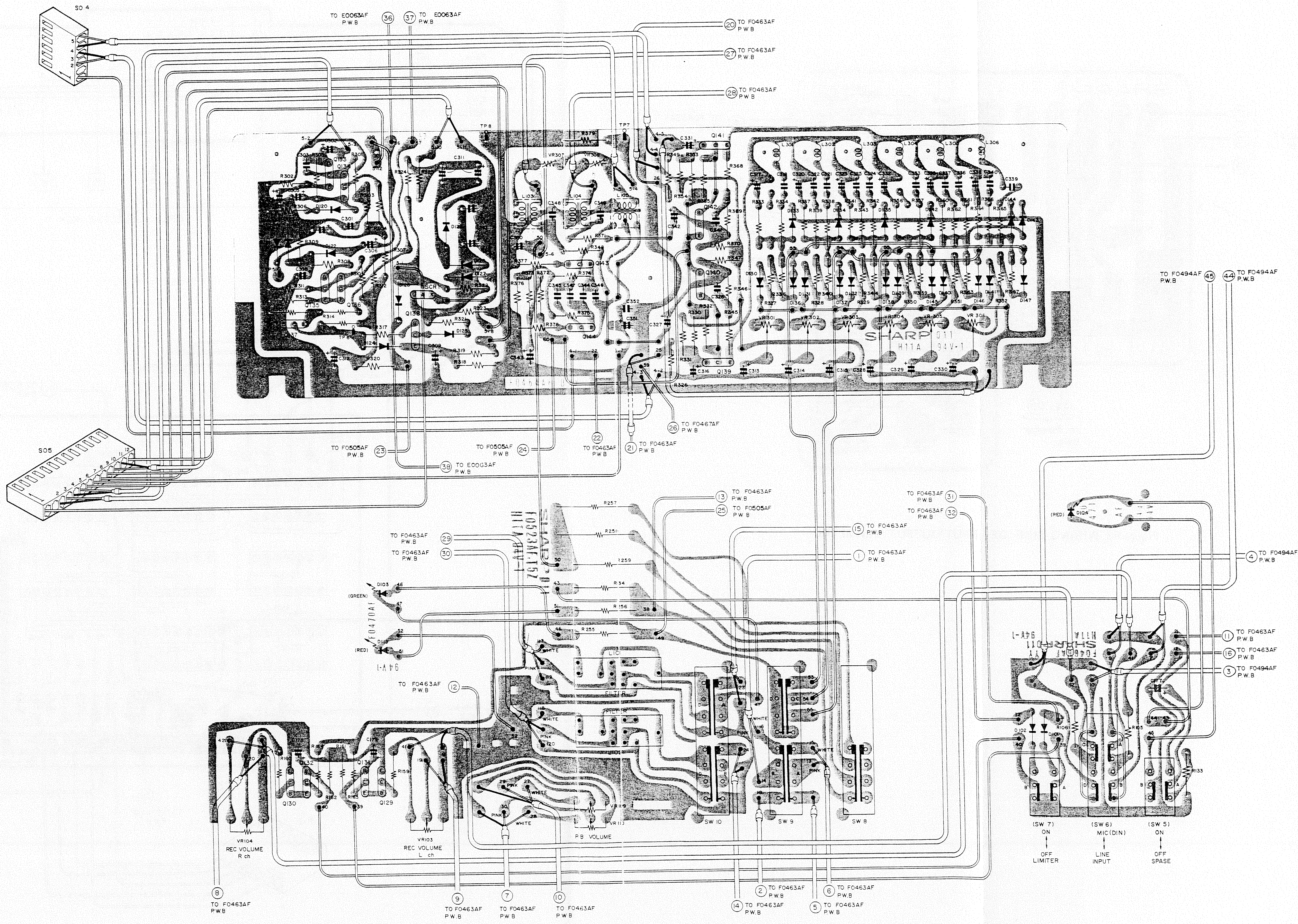

SO 4
TO E0063AF P.W.B ㊱
㊲ TO E0063AF P.W.B
⑳ TO F0463AF P.W.B
㉗ TO F0463AF P.W.B
㉘ TO F0463AF P.W.B
TO F0494AF P.W.B (45)
(44) TO F0494AF P.W.B
SO5
TO F0505AF P.W.B ㉓
TO F0505AF P.W.B ㉔
㉒ TO F0463AF P.W.B
㉑ TO F0463AF P.W.B
㉖ TO F0467AF P.W.B
㊳ TO E0063AF P.W.B
SHARP 011 H11A 94V-1
⑬ TO F0463AF P.W.B
㉕ TO F0505AF P.W.B
⑮ TO F0463AF P.W.B
① TO F0463AF P.W.B
TO F0463AF P.W.B ㉛
TO F0463AF P.W.B ㉜
TO F0463AF P.W.B ㉙
TO F0463AF P.W.B ㉚
④ TO F0494AF P.W.B
⑪ TO F0463AF P.W.B
⑯ TO F0463AF P.W.B
③ TO F0494AF P.W.B
TO F0463AF P.W.B ⑫
D103 (GREEN)
D118 (RED)
D104 (RED)
F0470AF 94V-1
VR104 REC VOLUME R ch
VR103 REC VOLUME L ch
P.B VOLUME
SW 10
SW 9
SW 8
(SW 7) ON OFF LIMITER
(SW 6) MIC(DIN) LINE INPUT
(SW 5) ON OFF SPASE
⑧ TO F0463AF P.W.B
⑨ TO F0463AF P.W.B
⑦ TO F0463AF P.W.B
⑩ TO F0463AF P.W.B
⑭ TO F0463AF P.W.B
② TO F0463AF P.W.B
⑤ TO F0463AF P.W.B
⑥ TO F0463AF P.W.B

Figure 52 WIRING SIDE OF VOLUME CONTROL BOARD

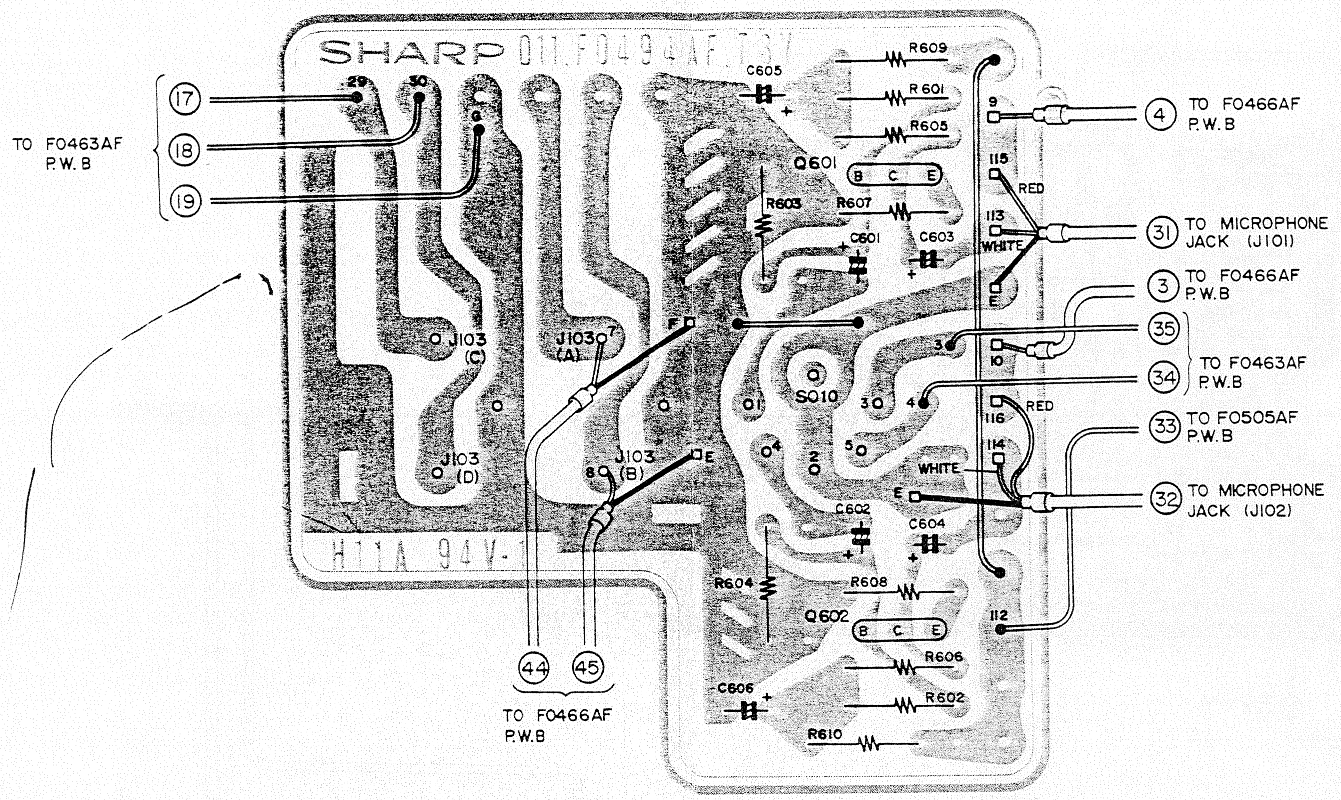

SHARP
TO F0463AF P.W.B
⑰
⑱
⑲
29
30
R609
R601
R605
C605
Q601
B C E
R603
R607
C601
C603
J103 (C)
J103 (A)
J103 (D)
J103 (B)
SO10
H11A 94V-1
9
115
RED
113
WHITE
E
10
116
114
RED
WHITE
112
C602
C604
R604
R608
Q602
R606
R602
C606
R610
④ TO F0466AF P.W.B
㉛ TO MICROPHONE JACK (J101)
③ TO F0466AF P.W.B
㉟
㉞ TO F0463AF P.W.B
㉝ TO F0505AF P.W.B
㉜ TO MICROPHONE JACK (J102)
㊹
㊺
TO F0466AF P.W.B

Figure 53 WIRING SIDE OF INPUT/OUTPUT TERMINAL

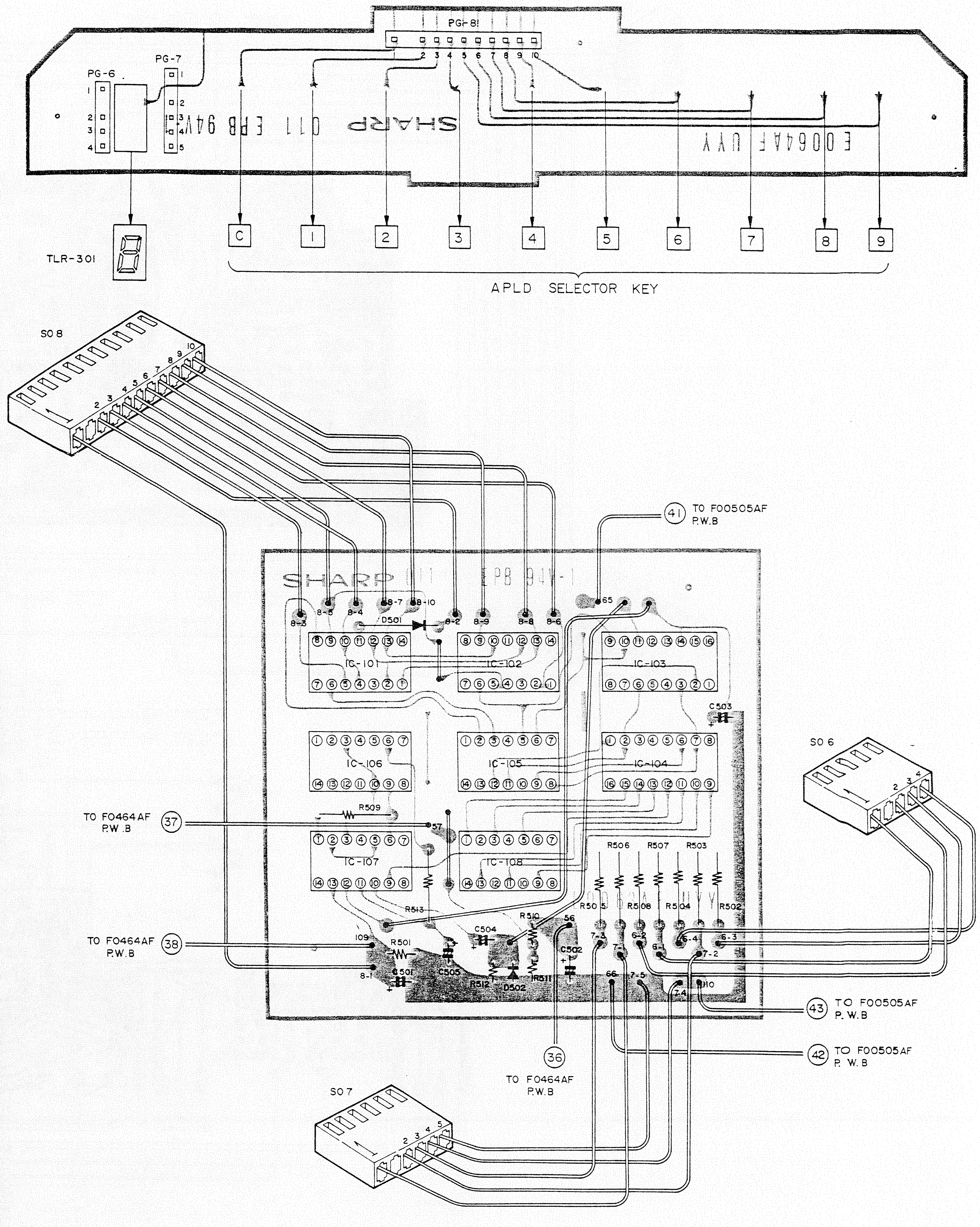
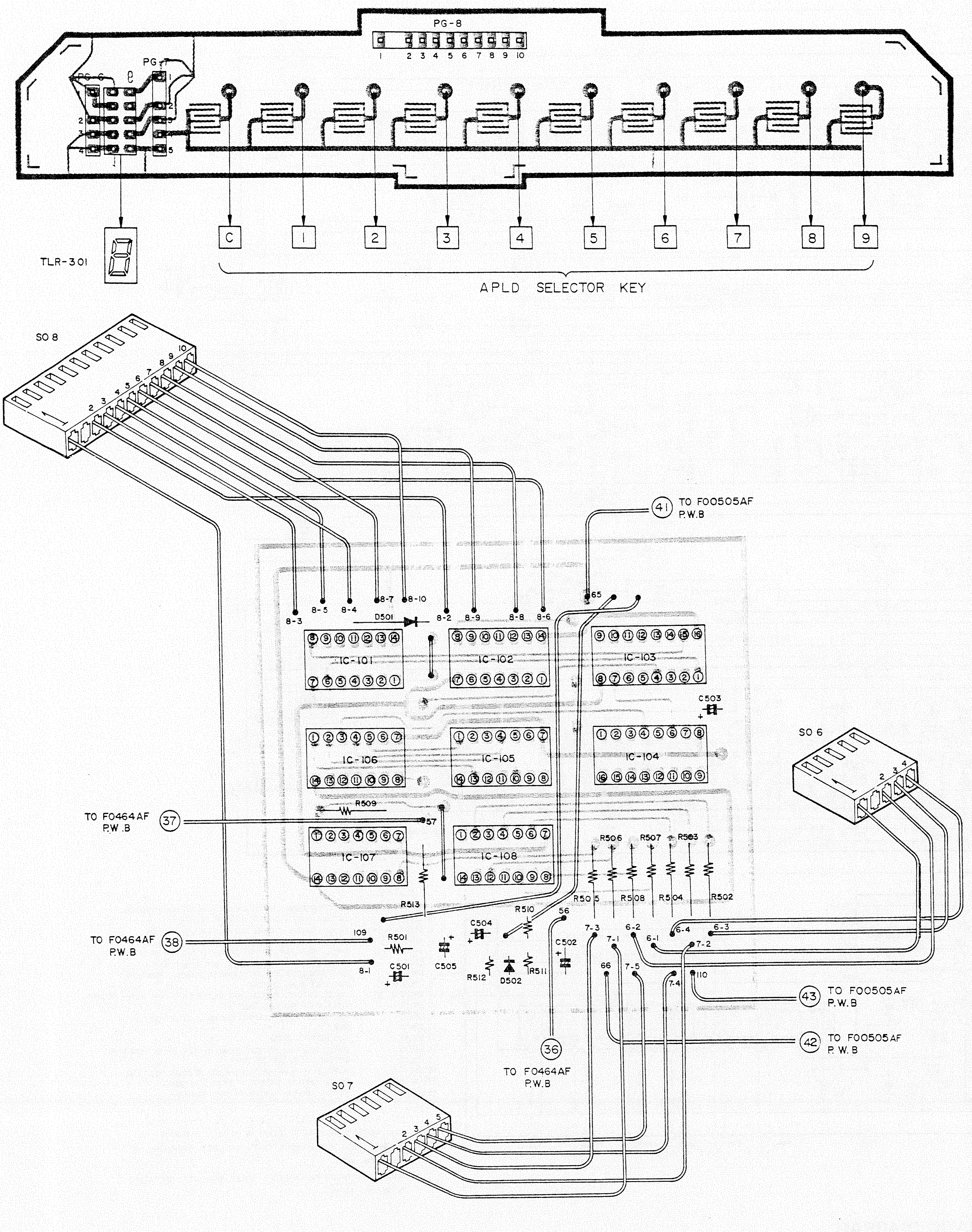
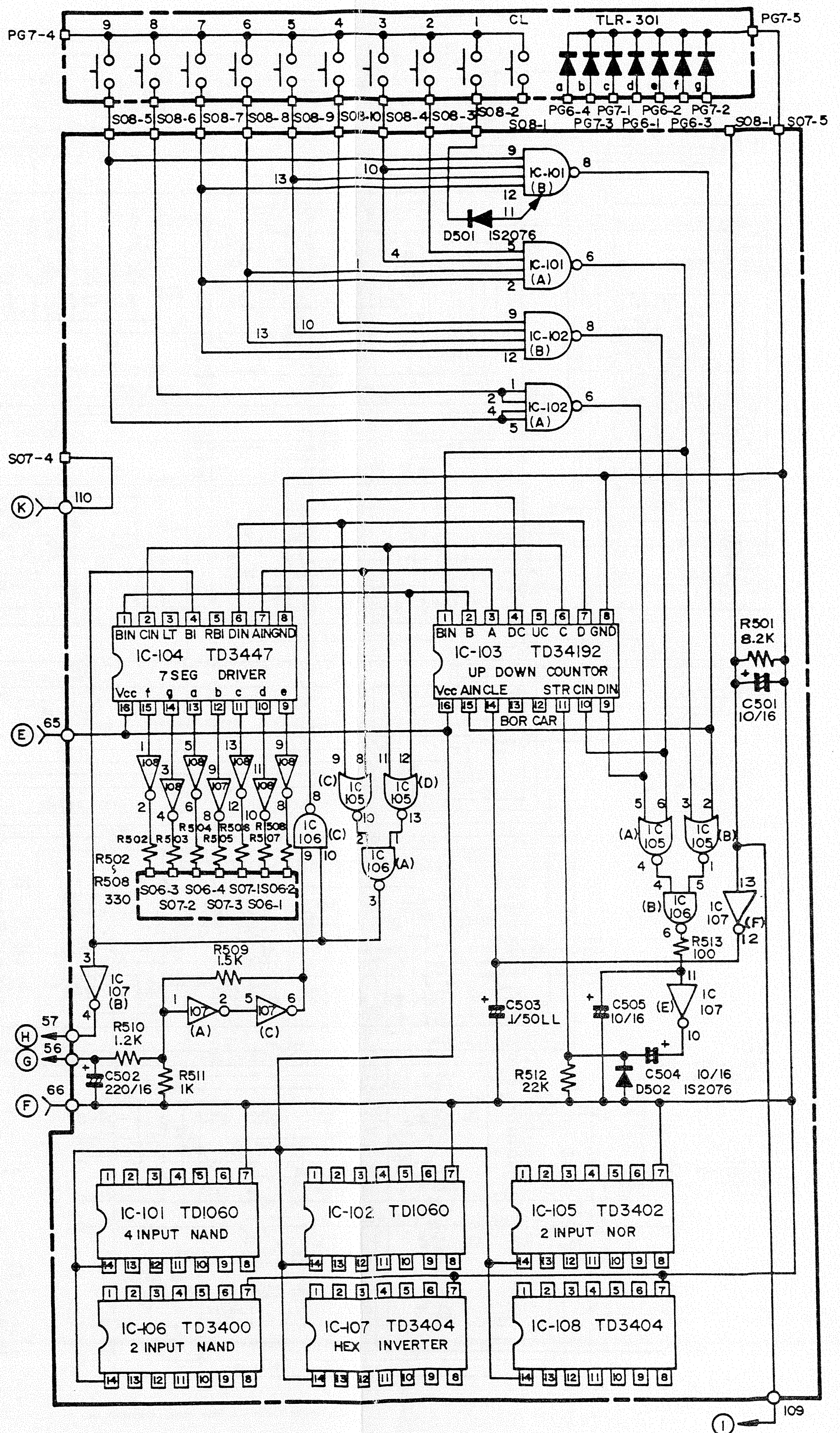

PG-8
PG-6
PG-7
SHARP 011 ERB 94V-1
E0064AF UYY
TLR-301
C
1
2
3
4
5
6
7
8
9
APLD SELECTOR KEY
SO 8
SO 6
SO 7
㊶ TO F00505AF P.W.B
TO F0464AF P.W.B ㊲
TO F0464AF P.W.B ㊳
㊸ TO F00505AF P.W.B
㊷ TO F00505AF P.W.B
㊱ TO F0464AF P.W.B
D501
IC-101
IC-102
IC-103
IC-104
IC-105
IC-106
IC-107
IC-108
R509
R513
R501
C501
C505
C504
R512
D502
R511
C502
R510
C503
R506
R507
R503
R505
R508
R504
R502
65
57
56
66
109
110

Figure 54 WIRING SIDE OF APLD BOARD



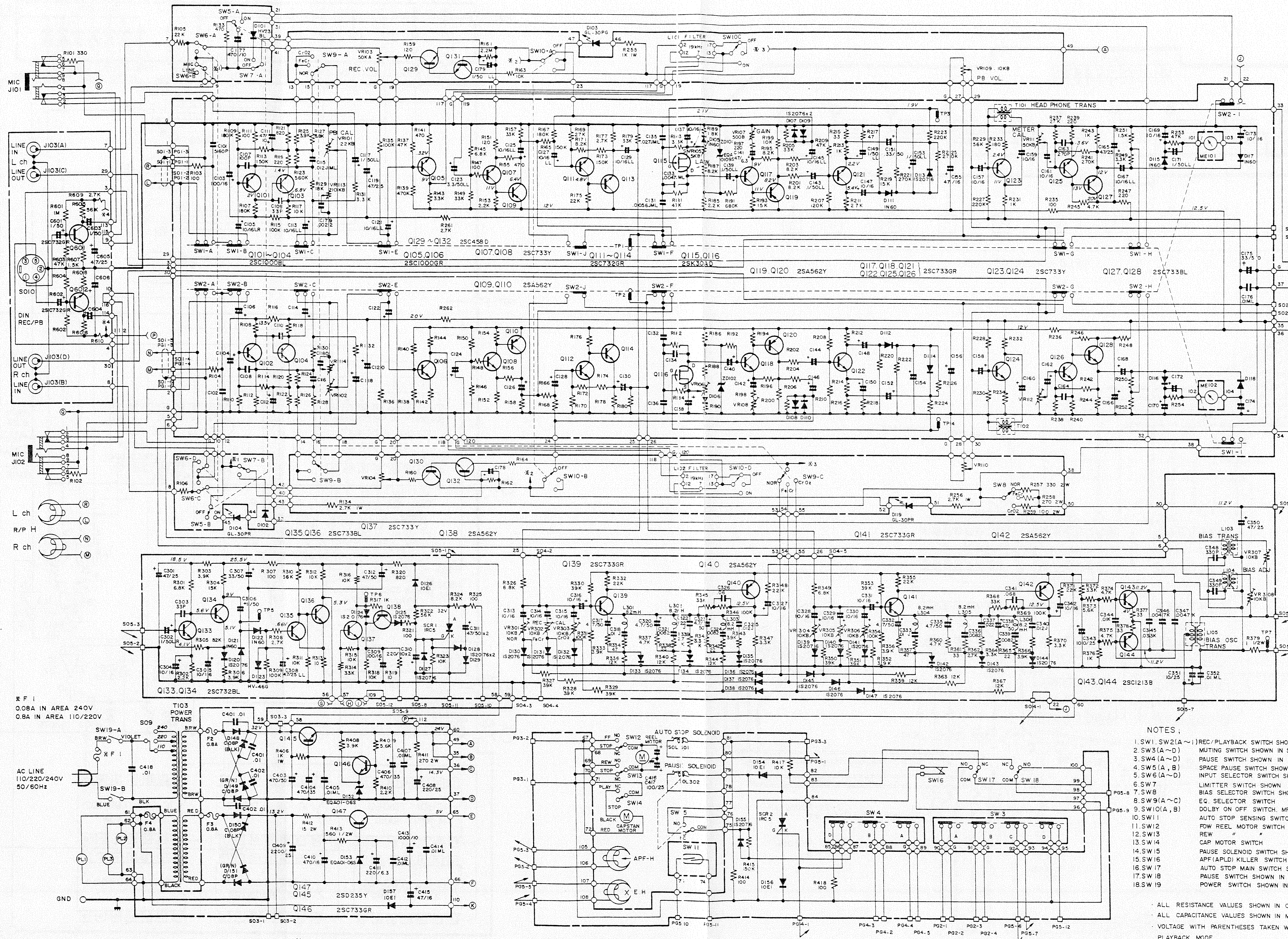
PG-8
1 2 3 4 5 6 7 8 9 10
PG-6
PG-7
TLR-301
C
1
2
3
4
5
6
7
8
9
APLD SELECTOR KEY
SO 8
8-3
8-5
8-4
8-7
8-10
D501
8-2
8-9
8-8
8-6
65
IC-101
IC-102
IC-103
C503
IC-106
IC-105
IC-104
R509
57
IC-107
IC-108
R506
R507
R503
R505
R508
R504
R502
R513
R510
56
C504
C502
109
R501
8-1
C501
C505
R512
D502
R511
7-3
7-1
66
7-5
6-2
6-1
6-4
6-3
7-2
7-4
110
SO 6
SO 7
(41) TO F00505AF P.W.B
(37) TO F0464AF P.W.B
(38) TO F0464AF P.W.B
(43) TO F00505AF P.W.B
(42) TO F00505AF P.W.B
(36) TO F0464AF P.W.B

Figure 55 COMPONENT SIDE OF APLD BOARD



PG7-4
PG7-5
9 8 7 6 5 4 3 2 1 CL
TLR-301
a b c d e f g
S08-5 S08-6 S08-7 S08-8 S08-9 S08-10 S08-4 S08-3 S08-2 S08-1
PG6-4 PG7-1 PG6-2 PG7-2
PG7-3 PG6-1 PG6-3
S08-1 S07-5
IC-101 (B)
D501 1S2076
IC-101 (A)
IC-102 (B)
IC-102 (A)
S07-4
110
K
E
65
BIN CIN LT BI RBI DIN AINGND
IC-104 TD3447
7SEG DRIVER
Vcc f g a b c d e
BIN B A DC UC C D GND
IC-103 TD34192
UP DOWN COUNTOR
Vcc AIN CLE STR CIN DIN
BOR CAR
R501 8.2K
C501 10/16
IC 108
IC 105 (C)
IC 105 (D)
IC 106 (C)
IC 106 (A)
IC 105 (A)
IC 105 (B)
IC 106 (B)
IC 107 (F)
R502
R503
R504
R505
R506
R507
R508
R502 ~ R508 330
S06-3 S06-4 S07-1 S06-2
S07-2 S07-3 S06-1
R513 100
R509 1.5K
IC 107 (B)
IC 107 (A)
IC 107 (C)
IC 107 (E)
C503 1/50LL
C505 10/16
R510 1.2K
57
H
56
G
66
F
C502 220/16
R511 1K
R512 22K
C504 10/16
D502 1S2076
IC-101 TD1060 4 INPUT NAND
IC-102 TD1060
IC-105 TD3402 2 INPUT NOR
IC-106 TD3400 2 INPUT NAND
IC-107 TD3404 HEX INVERTER
IC-108 TD3404
I
109

Figure 56 APLD SCHEMATIC DIAGRAM


MIC J101
LINE IN J103(A)
L ch
LINE OUT J103(C)
DIN REC/PB
S010
LINE OUT J103(D)
R ch
LINE IN J103(B)
MIC J102
L ch
R/P H
R ch
Q101~Q104 2SC1000BL
Q105.Q106 2SC1000GR
Q107.Q108 2SC733Y
Q109.Q110 2SA562Y
Q111~Q114 2SC732GR
Q115.Q116 2SK30AD
Q117.Q118 Q121 Q122.Q125.Q126 2SC733GR
Q119.Q120 2SA562Y
Q123.Q124 2SC733Y
Q127.Q128 2SC733BL
Q129~Q132 2SC458D
Q135.Q136 2SC733BL
Q137 2SC733Y
Q138 2SA562Y
Q139 2SC733GR
Q140 2SA562Y
Q141 2SC733GR
Q142 2SA562Y
Q143.Q144 2SC1213B
Q133.Q134 2SC732BL
T101 HEAD PHONE TRANS
HEAD PHONES J104
REC. VOL
PB VOL
METER CAL
ME101
ME102
L101 FILTER
L102 FILTER
BIAS TRANS
BIAS ADJ
BIAS OSC TRANS
T103 POWER TRANS
AC LINE 110/220/240V 50/60Hz
GND
Q147 Q145 2SD235Y
Q146 2SC733GR
AUTO STOP SOLENOID
PAUSE SOLENOID
REEL MOTOR
CAPSTAN MOTOR
APF-H
E.H
SW 4
SW 3
※F1
0.08A IN AREA 240V
0.8A IN AREA 110/220V

Manufactured Underlicence from Dolby Laboratories Inc.

NOTES ;

1. SW1. SW2(A~I) REC/PLAYBACK SWITCH SHOWN IN PLAYBACK POSITION.
2. SW3(A~D) MUTING SWITCH SHOWN IN STOP POSITION.
3. SW4(A~D) PAUSE SWITCH SHOWN IN NON PAUSE POSITION.
4. SW5(A, B) SPACE PAUSE SWITCH SHOWN IN OFF POSITION.
5. SW6(A~D) INPUT SELECTOR SWITCH SHOWN IN MIC(DIN) POSITION.
6. SW7 LIMITTER SWITCH SHOWN IN OFF POSITION.
7. SW8 BIAS SELECTOR SWITCH SHOWN IN NORMAL POSITION.
8. SW9(A~C) EQ. SELECTOR SWITCH 〃 〃
9. SW10(A, B) DOLBY ON OFF SWITCH. MPX FILTER SW SHOWN IN OFF POSITION.
10. SW11 AUTO STOP SENSING SWITCH.
11. SW12 FOW REEL MOTOR SWITCH SHOWN IN STOP POSITION.
12. SW13 REW 〃 〃 〃 〃
13. SW14 CAP MOTOR SWITCH 〃 〃
14. SW15 PAUSE SOLENOID SWITCH SHOWN IN NON PAUSE POSITION.
15. SW16 APF(APLD) KILLER SWITCH.
16. SW17 AUTO STOP MAIN SWITCH SHOWN IN STOP POSITION.
17. SW18 PAUSE SWITCH SHOWN IN STOP POSITION.
18. SW19 POWER SWITCH SHOWN IN OFF POSITION.

- ALL RESISTANCE VALUES SHOWN IN OHMS, K=1000 M=10^6
- ALL CAPACITANCE VALUES SHOWN IN MFDS, P=MMFD
- VOLTAGE WITH PARENTHESES TAKEN WITH SET OPERATING IN PLAYBACK MODE.
- VOLTAGE WITHOUT PARENTHESES TAKEN WITH SET OPERATING IN RECORD MODE.

(Specifications or wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 57 SCHEMATIC DIAGRAM

RT- 3535

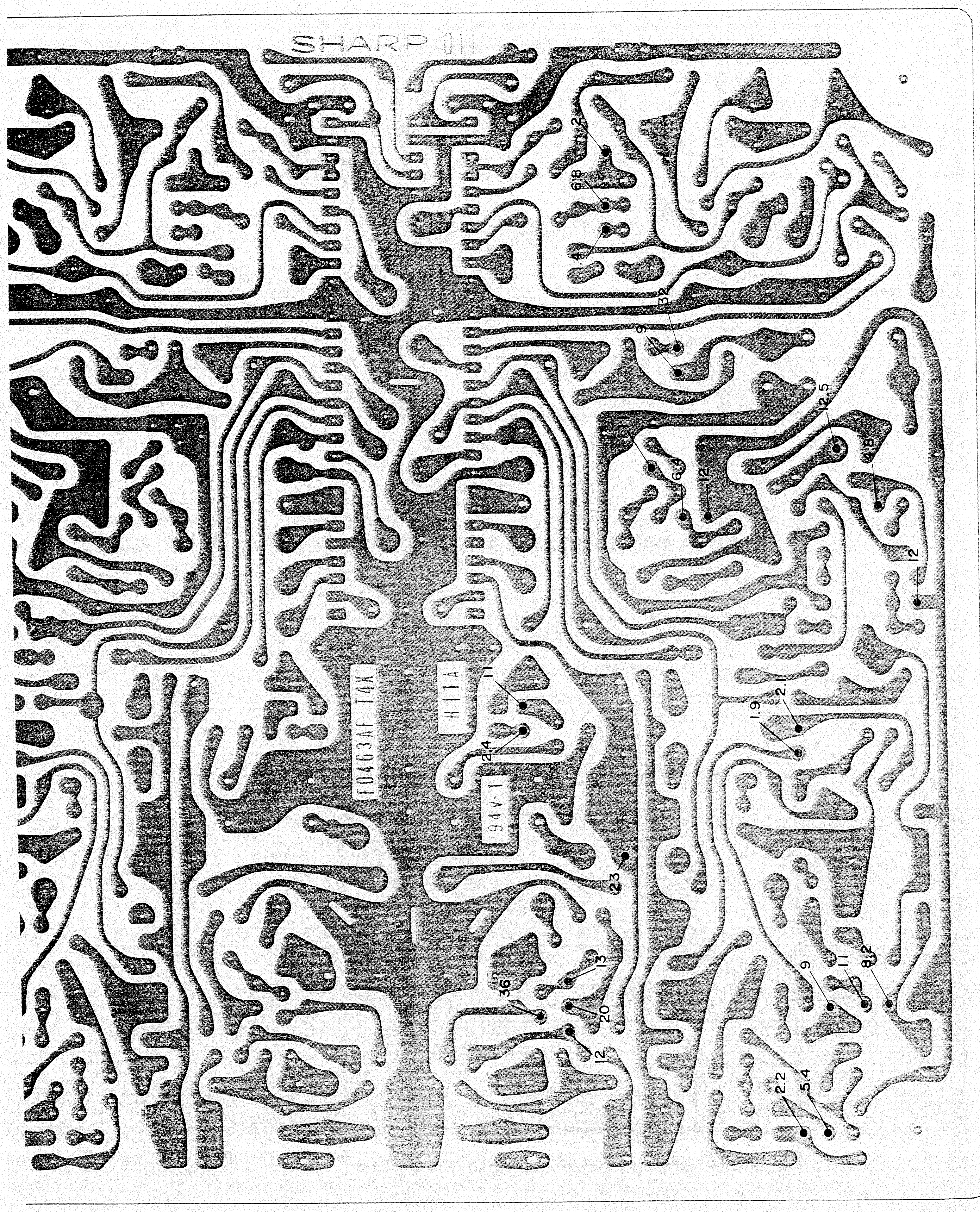

SHARP 011
F0463AF T4K
H11A
94V-1
6.8
11.2
3.2
9
6
12
2.5
4.8
12
11
2.4
1.9
2.1
23
36
13
20
12
9
11
8.2
2.2
5.4

Figure 58

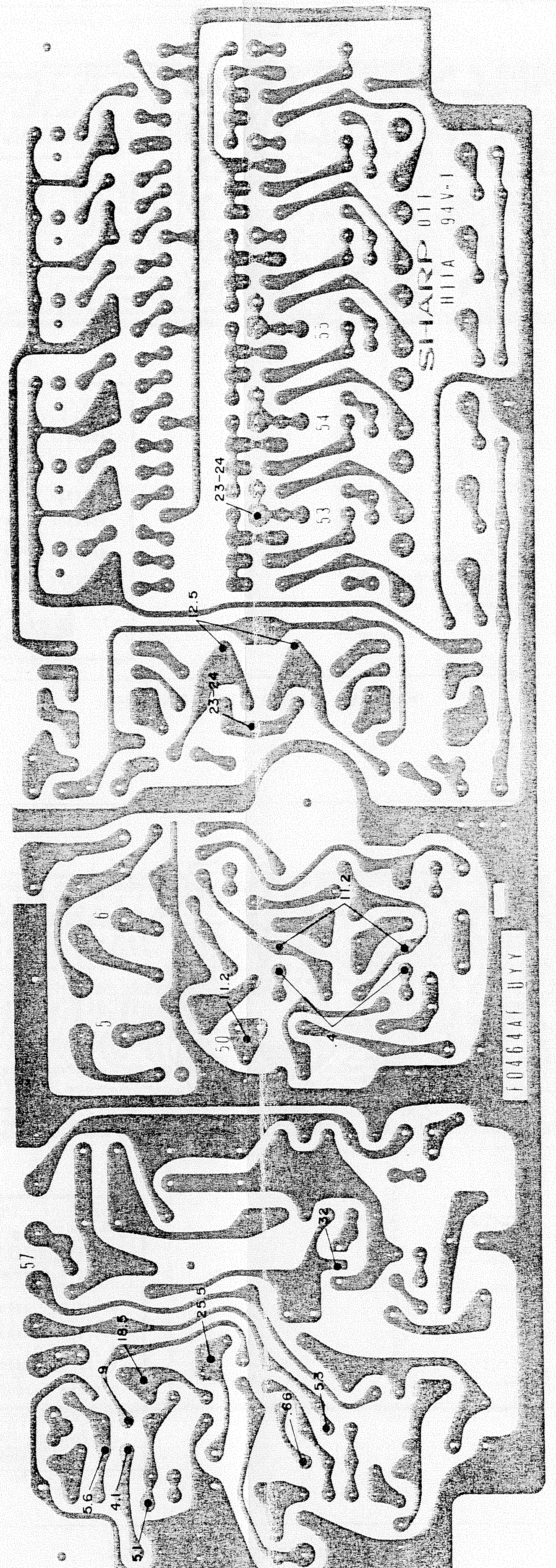

SHARP 011
H11A
94V-1
55
54
53
23~24
12.5
23~24
11.2
11.2
50
4
F0464AF 0YY
6
5
57
32
18.8
25.5
9
53
66
5.6
4.1
51

Figure 59

X

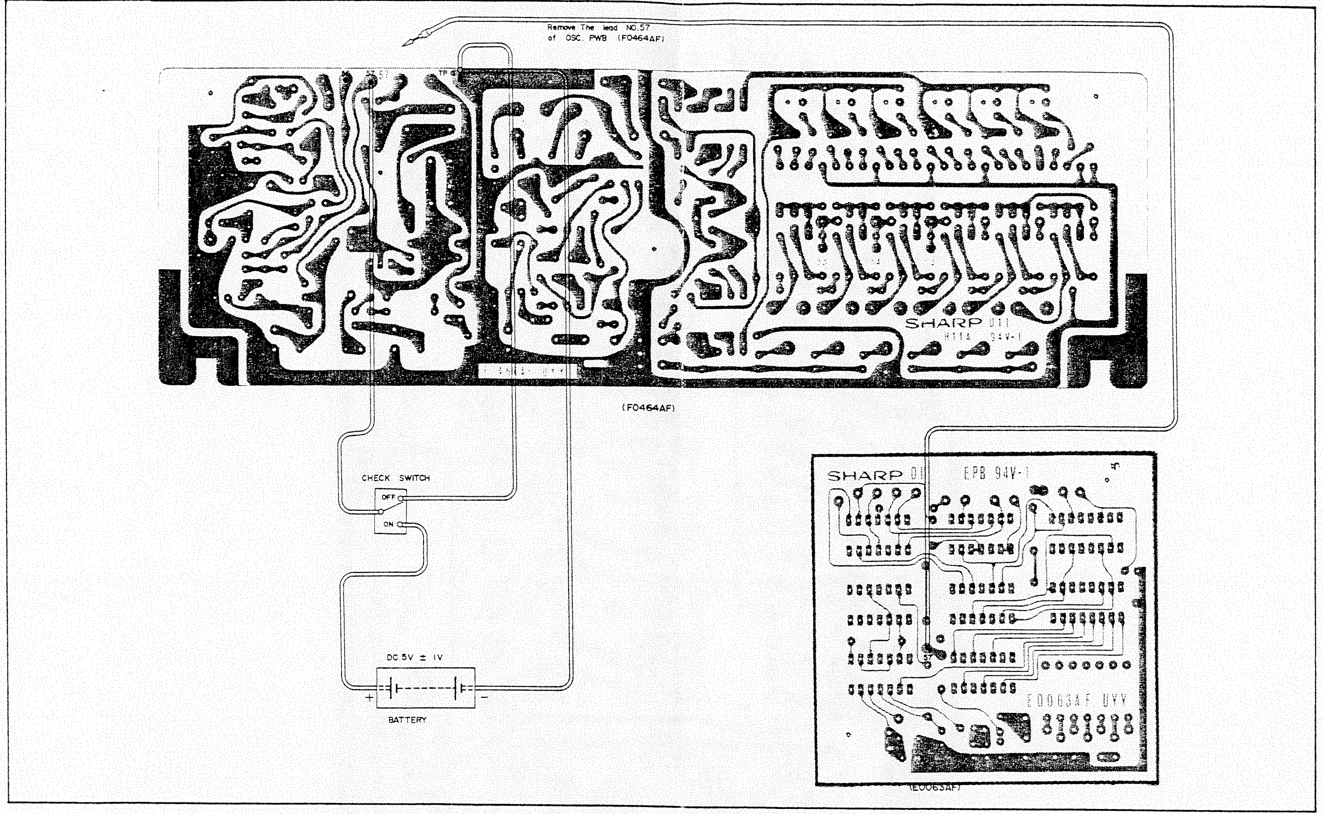

Remove The lead NO.57
of OSC. PWB (F0464AF)
TP
57
(F0464AF)
SHARP 011
CHECK SWITCH
OFF
ON
DC 5V ± 1V
BATTERY
+
−
SHARP 011 EPB 94V-1
E0063AF
(E0063AF)

Figure 60 AUTO STOP CHEKER

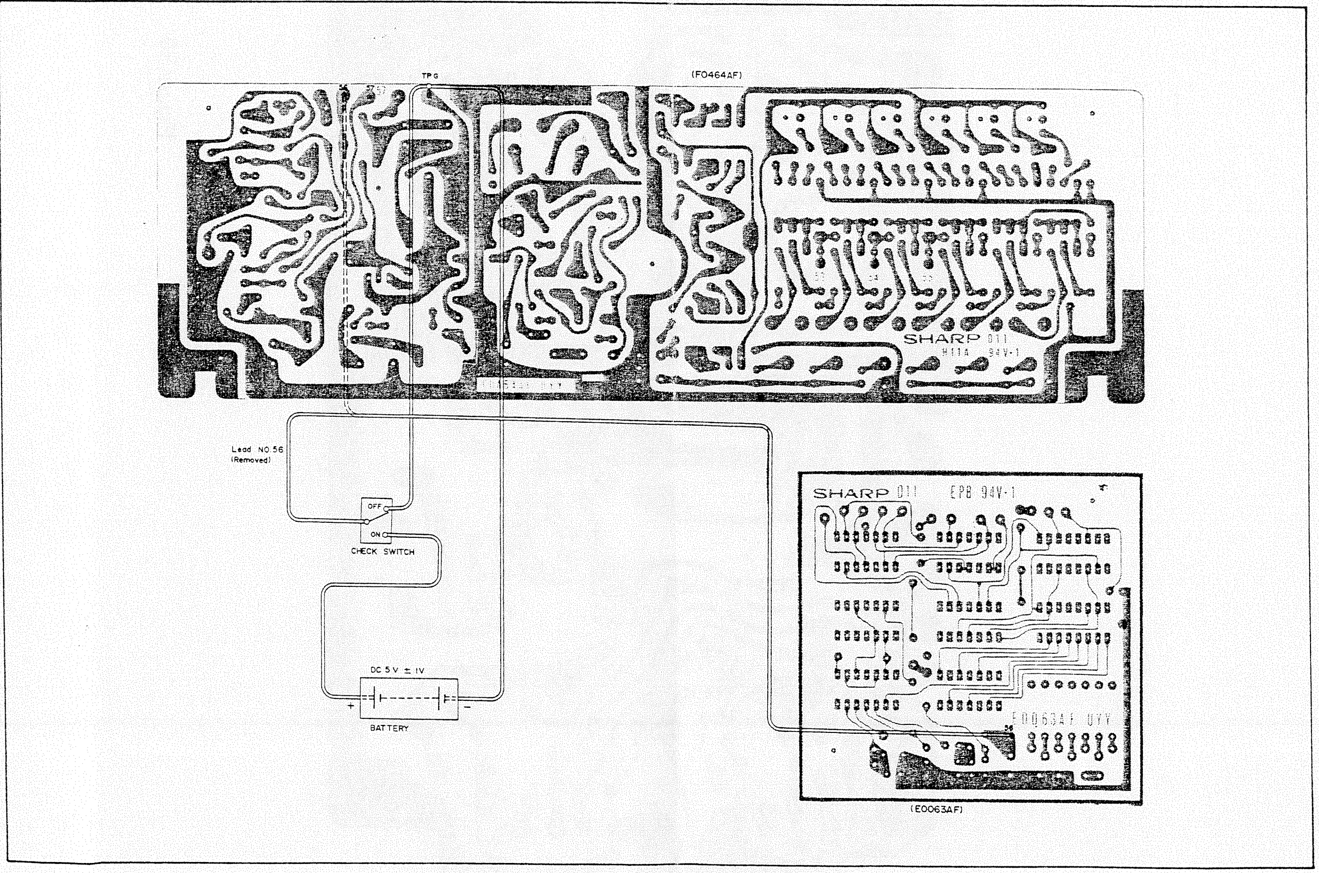

TP
(F0464AF)
SHARP 011
Lead NO.56
(Removed)
OFF
ON
CHECK SWITCH
DC 5V ± 1V
BATTERY
+
−
SHARP 011 EPB 94V-1
E0063AF
(E0063AF)

Figure 61 COUNT DOWN CHEKER

X

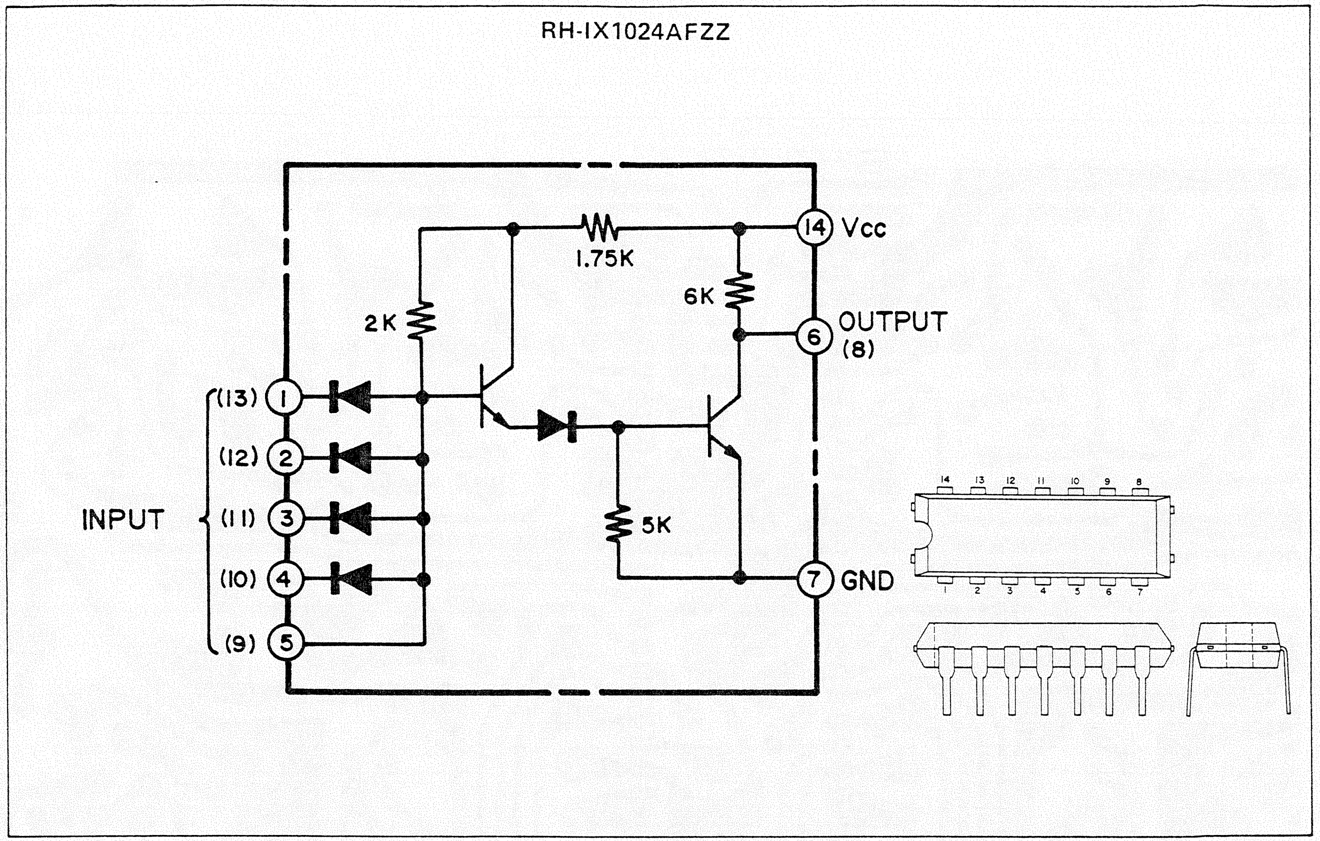

RH-IX1024AFZZ
1.75K
2K
6K
5K
14 Vcc
6 OUTPUT
(8)
7 GND
INPUT
(13) 1
(12) 2
(11) 3
(10) 4
(9) 5
14 13 12 11 10 9 8
1 2 3 4 5 6 7

Figure 62 EQUIVALENT CIRCUIT OF INTEGRATED CIRCUIT (IC-101 · IC-102)

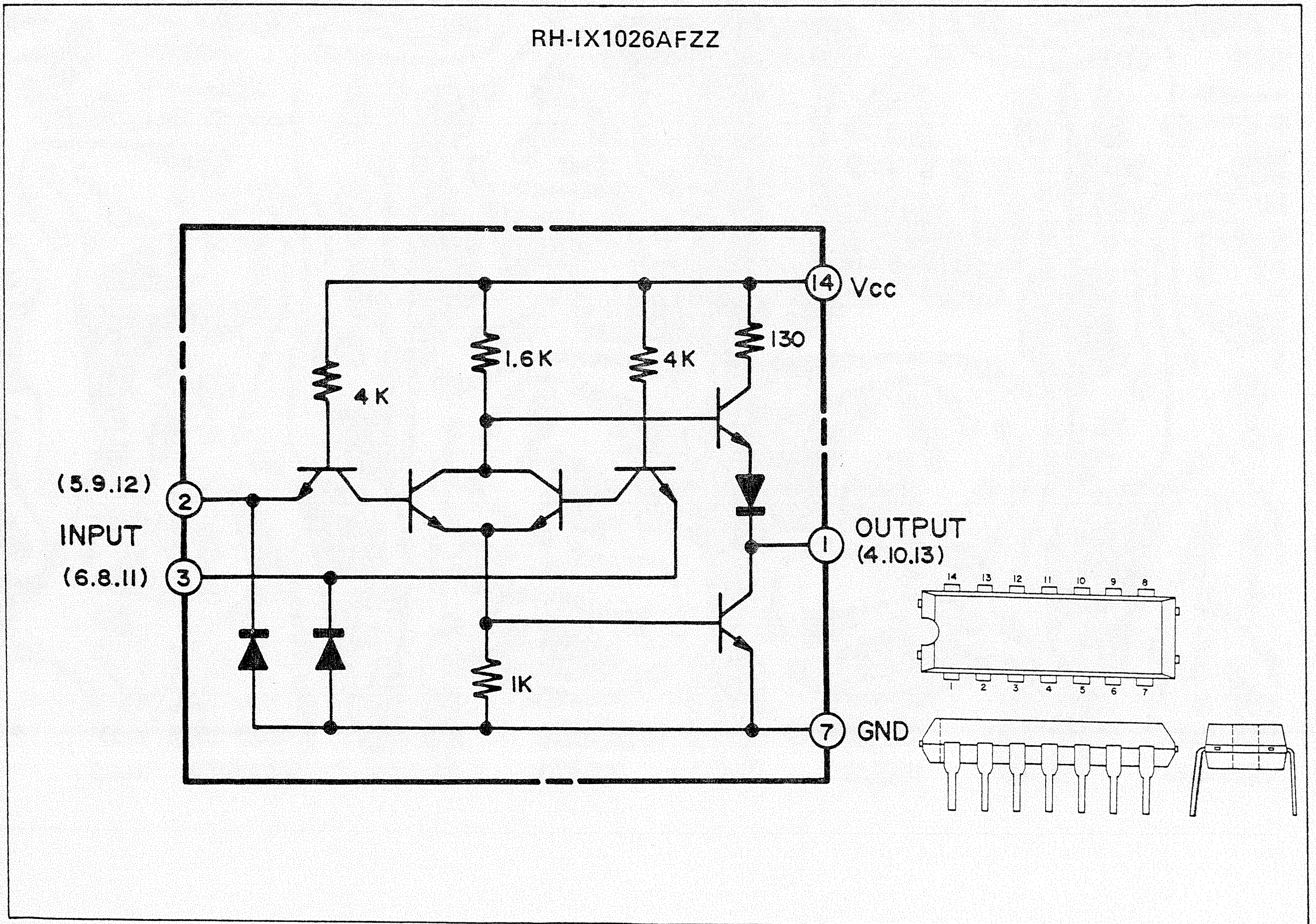

RH-IX1026AFZZ
14 Vcc
4K
1.6K
4K
130
1K
(5.9.12)
2
INPUT
(6.8.11)
3
1 OUTPUT
(4.10.13)
7 GND
14 13 12 11 10 9 8
1 2 3 4 5 6 7

Figure 63 EQUIVALENT CIRCUIT OF INTEGRATED CIRCUIT (IC-105)

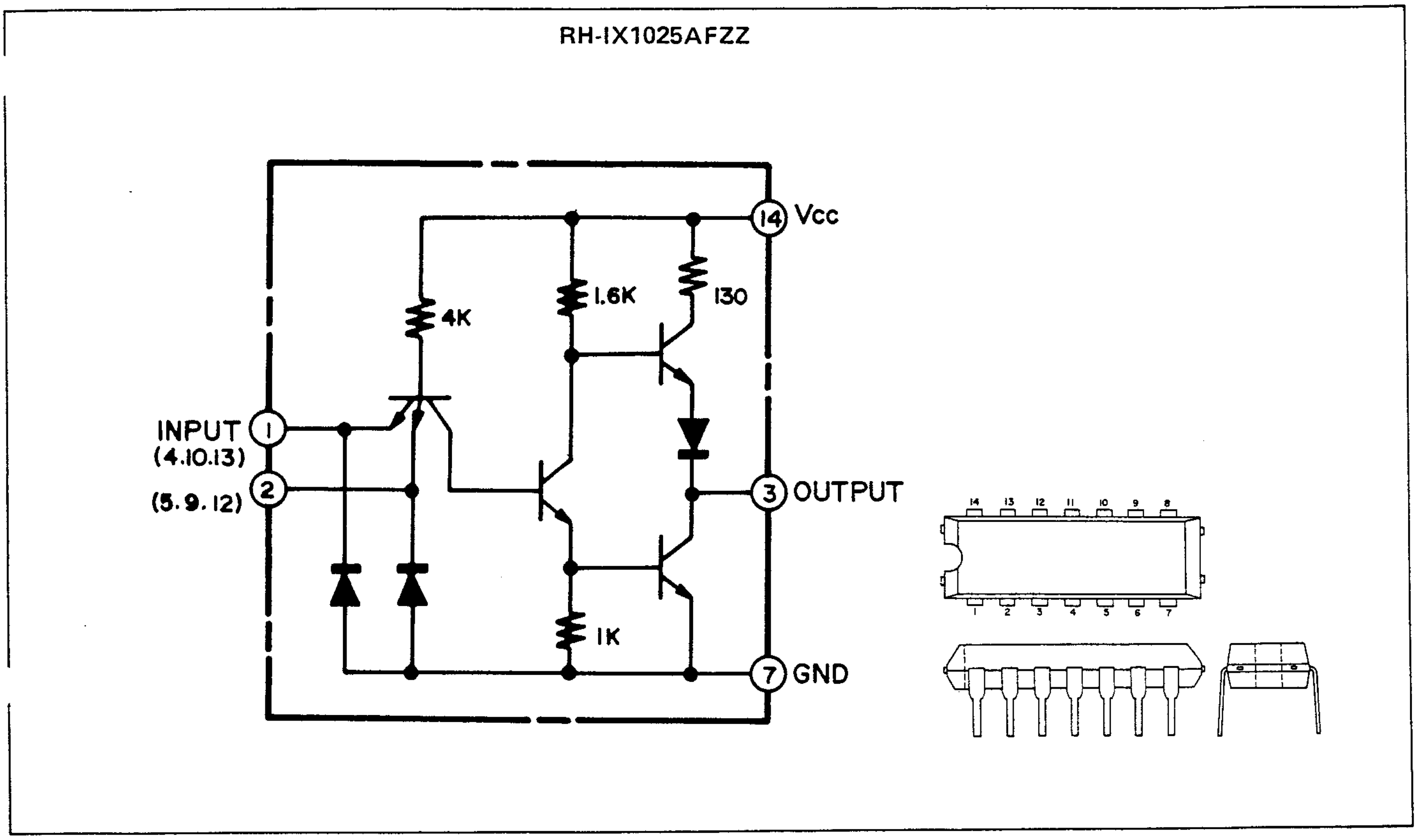

RH-IX1025AFZZ
14
Vcc
4K
1.6K
130
INPUT
1
(4.10.13)
2
(5.9.12)
3
OUTPUT
1K
7
GND
14 13 12 11 10 9 8
1 2 3 4 5 6 7

Figure 64 EQUIVALENT CIRCUIT OF INTEGRATED CIRCUIT (IC-106)

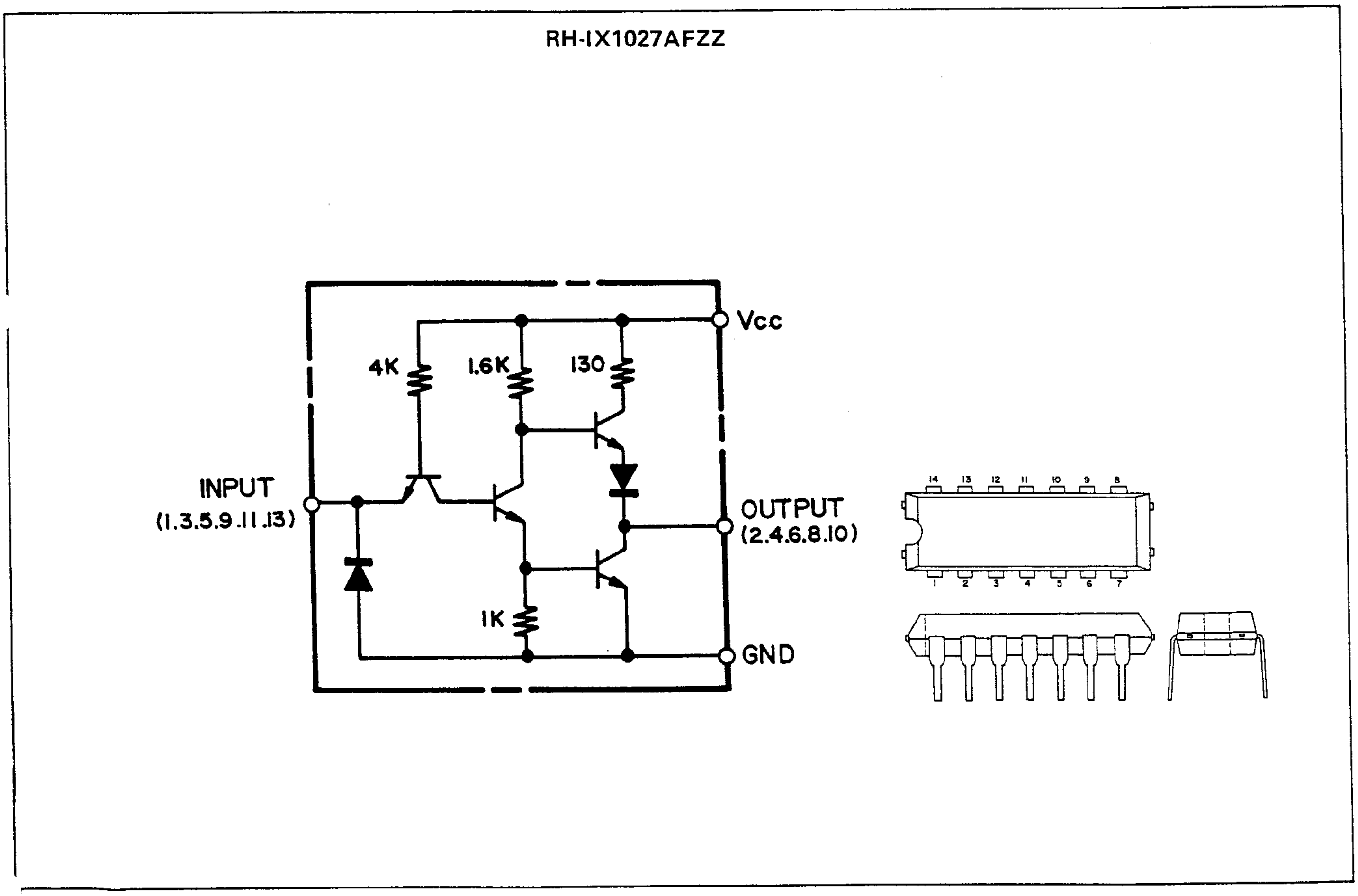

RH-IX1027AFZZ
Vcc
4K
1.6K
130
INPUT
(1.3.5.9.11.13)
OUTPUT
(2.4.6.8.10)
1K
GND
14 13 12 11 10 9 8
1 2 3 4 5 6 7

Figure 65 EQUIVALENT CIRCUIT OF INTEGRATED CIRCUIT (IC-107 · IC-108)

RH-IX1028AFZZ

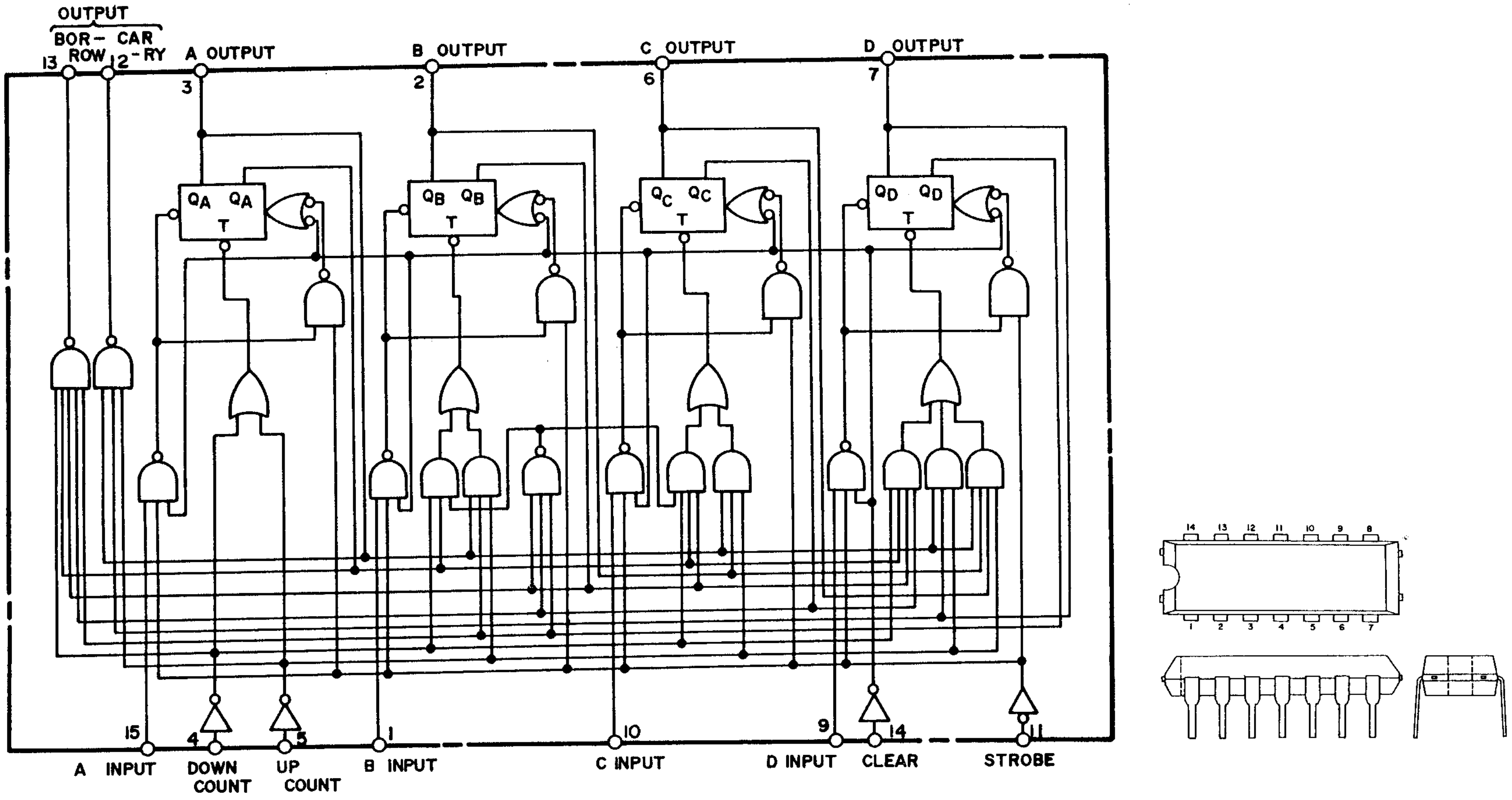

OUTPUT
BOR-ROW
CAR-RY
13
12
A OUTPUT
3
B OUTPUT
2
C OUTPUT
6
D OUTPUT
7
Q_A Q_A T
Q_B Q_B T
Q_C Q_C T
Q_D Q_D T
15
A INPUT
4
DOWN COUNT
5
UP COUNT
1
B INPUT
10
C INPUT
9
D INPUT
14
CLEAR
11
STROBE
14 13 12 11 10 9 8
1 2 3 4 5 6 7

Figure 66 EQUIVALENT CIRCUIT OF INTEGRATED CIRCUIT (IC-103)

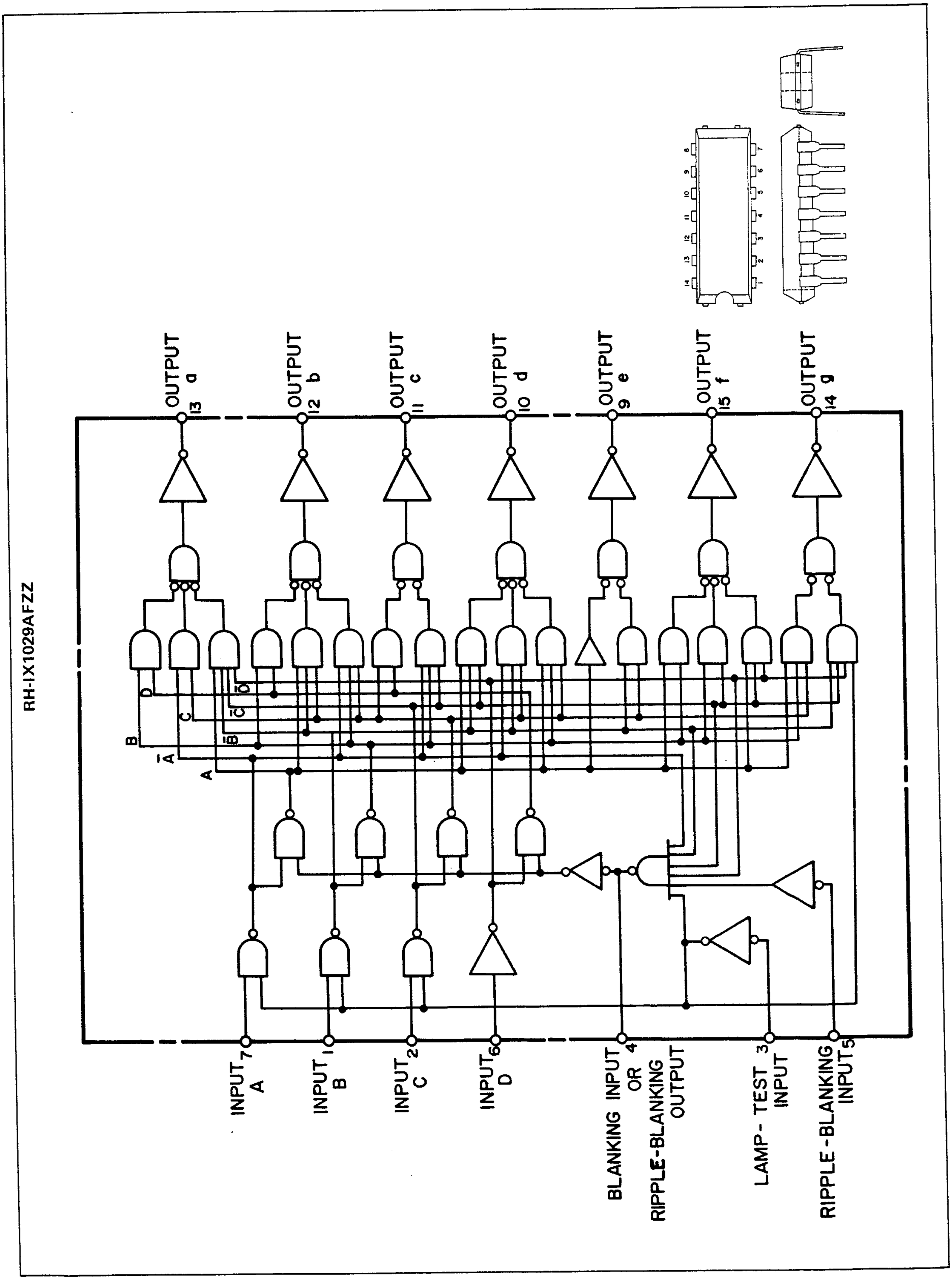

RH-IX1029AFZZ
OUTPUT 13 a
OUTPUT 12 b
OUTPUT 11 c
OUTPUT 10 d
OUTPUT 9 e
OUTPUT 15 f
OUTPUT 14 g
A
Ā
B
B̄
C
C̄
D
D̄
INPUT 7 A
INPUT 1 B
INPUT 2 C
INPUT 6 D
BLANKING INPUT OR RIPPLE-BLANKING OUTPUT 4
LAMP- TEST INPUT 3
RIPPLE-BLANKING INPUT 5
14
13
12
11
10
9
8
1
2
3
4
5
6
7

Figure 67 EQUIVALENT CIRCUIT OF INTEGRATED CIRCUIT (IC-104)

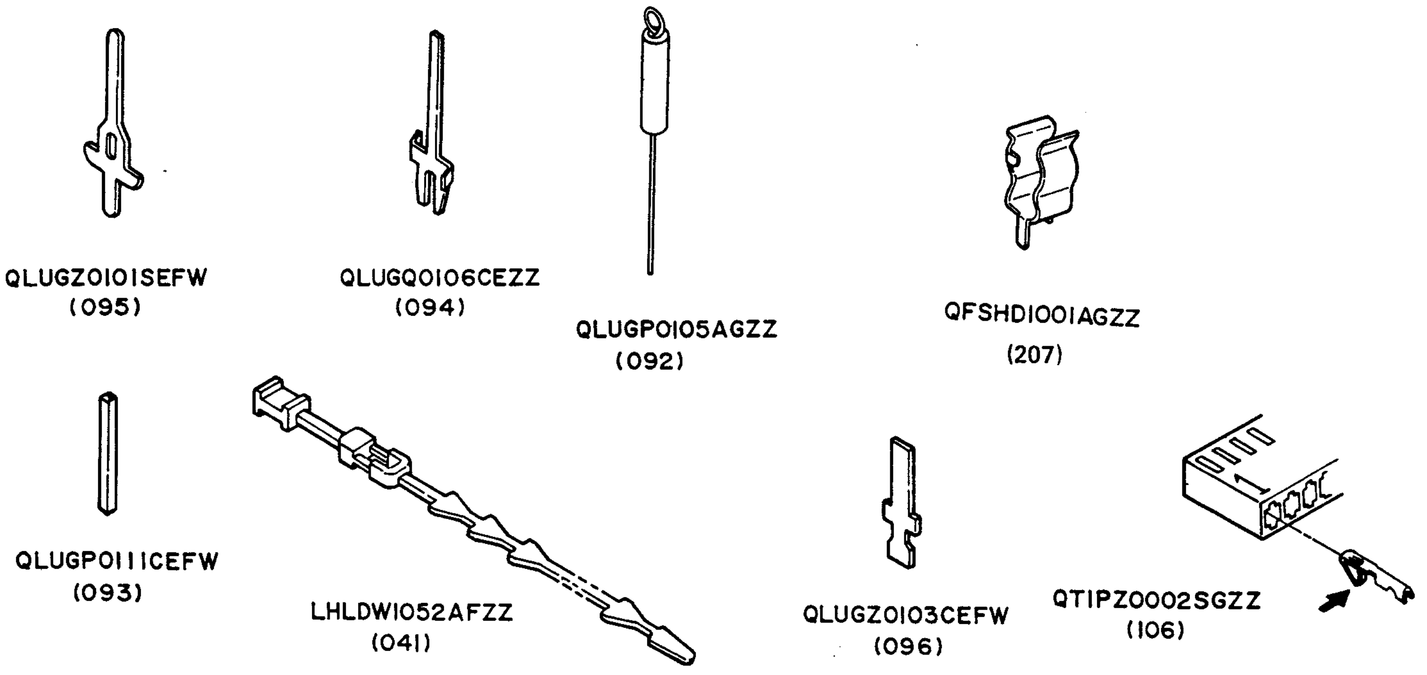

QLUGZ0101SEFW
(095)
QLUGQ0106CEZZ
(094)
QLUGP0105AGZZ
(092)
QFSHD1001AGZZ
(207)
QLUGP0111CEFW
(093)
LHLDW1052AFZZ
(041)
QLUGZ0103CEFW
(096)
QTIPZ0002SGZZ
(106)

Fig. 68

088 (Mains Supply Cord)	036 (Cord Bushing)
QACCB0052AF09	LBSHC0004AGZZ
QACCL0001AFZZ	LBSHC0007AGZZ
QACCV0001AGZZ	LBSHC0004AGZZ
QACCZ0002AG08	LBSHC0007AFZZ
QACCZ0002TA0F	LBSHC0007AFZZ

Table 2

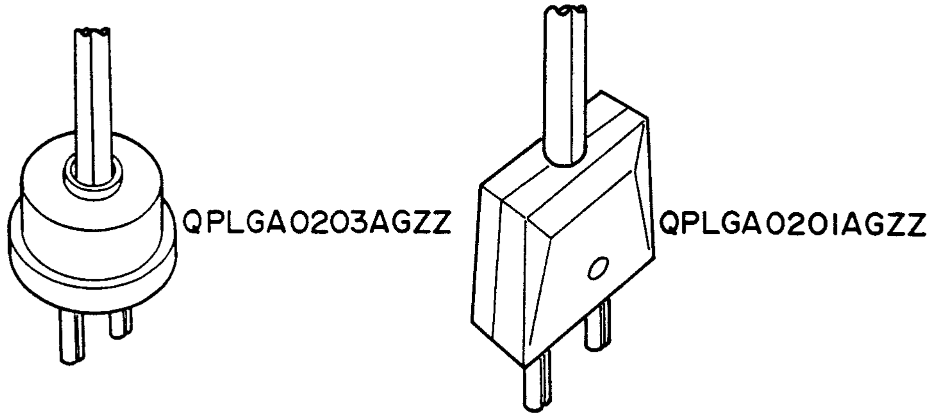

QPLGA0203AGZZ
QPLGA0201AGZZ

Fig. 69

REPLACEMENT PARTS LIST

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

TRANSISTORS

REF. NO.	PART NO.	DESCRIPTION	CODE
Q101, Q102	VS2SC1000BL-1	Audio Amp.	AF
Q103, Q104	VS2SC1000BL-1	Audio Amp.	AF
Q105, Q106	VS2SC1000GR-1	Audio Amp.	AF
Q107, Q108	VS2SC733-Y/-1	Audio Amp.	AF
Q109, Q110	VS2SA562-Y/-1	Audio Amp.	AG
Q111, Q112	VS2SC732-G/-1	Dolby Summing Amp.	AF
Q113, Q114	VS2SC732-G/-1	Dolby Summing Amp.	AF
Q115, Q116	VS2SK30-D//-1	Dolby Side Chain	AG
Q117, Q118	VS2SC733-G/-1	Dolby Side Chain	AF
Q119, Q120	VS2SA562-Y/-1	Dolby Side Chain	AG
Q121, Q122	VS2SC733-G/-1	Dolby Side Chain	AF
Q123, Q124	VS2SC733-Y/-1	Headphone Amp.	AF
Q125, Q126	VS2SC733-G/-1	Meter Amp.	AF
Q127, Q128	VS2SC733-B/-1	Meter Amp.	AF
Q129, Q130, Q131, Q132	VS2SC458-D/-1	Limiter Amp	AF
Q133	VS2SC732-B/-1	A.P.F. Audio Amp. & Limiter (AC Amp.)	AF
Q134	VS2SC732-B/-1	A.P.F. Audio Amp. & Limiter (AC Amp.)	AF
Q135	VS2SC733-B/-1	DC Amplifier	AF
Q136	VS2SC733-B/-1	DC Amplifier	AF
Q137	VS2SC733-Y/-1	Interface	AF
Q138	VS2SA562-Y/-1	Memory	AG
Q139	VS2SC733-G/-1	Record Equalizer Amp.	AF
Q140	VS2SA562-Y/-1	Record Equalizer Amp.	AG
Q141	VS2SC733-G/-1	Record Equalizer Amp.	AF
Q142	VS2SA562-Y/-1	Record Equalizer Amp.	AG
Q143	VS2SC1213-B-1	Bias Oscillation	AF
Q144	VS2SC1213-B-1	Bias Oscillation	AF
Q145	VS2SD235-Y/-1	Voltage Regulator	AG
Q146	VS2SC733-G/-1	Voltage Regulator	AF
Q147	VS2SD235-Y/-1	Voltage Regulator	AG
Q601, Q602	VS2SC732-G/-1	Record Playback Amp.	AF

DIODES

REF. NO.	PART NO.	DESCRIPTION	CODE
D101, D102	VHVHV23G-B/-1	Limiter Rectifier	AC
D105, D106	VHD1N60////-1	Thermal Compensation	AB
D107, D108	VHD1S2076//-1	Limiter	AB
D109, D110	VHD1S2076//-1	Limiter	AB
D111, D112	VHD1N60////-1	Rectifier	AB
D113, D114	VHD1S2076//-1	Time Constant	AB
D115, D116	VHD1N60////-1	Meter Circuit	AB
D117, D118	VHD1N60////-1	Meter Circuit	AB
D119	VHPGL30PR//-1	RECORD Indicator	AD
D120	VHD1S2076//-1	Thermal Compensation	AB
D121	VHD1N60////-1	Rectifier	AB
D122	VHD1N60////-1	Rectifier	AB
D123	VHVHV46-G//-1	Time Constant	AD
D124	VHD1S2076//-1	Clamping	AB
D125	VHD1S2076//-1	Back Current Prevention	AB
D126	RH-DX1006AFZZ	Surge Absorber	AC
D127	VHD1S2076//-1	Clamping	AB
D128	VHD1S2076//-1	Rectifier	AB
D129	VHD1S2076//-1	Rectifier	AB
D130	VHD1S2076//-1	Switching	AB
D131	VHD1S2076//-1	Switching	AB
D132	VHD1S2076//-1	Switching	AB
D133	VHD1S2076//-1	Switching	AB
D134	VHD1S2076//-1	Switching	AB
D135	VHD1S2076//-1	Switching	AB
D136	VHD1S2076//-1	Switching	AB
D137	VHD1S2076//-1	Switching	AB
D138	VHD1S2076//-1	Switching	AB
D139	VHD1S2076//-1	Switching	AB
D140	VHD1S2076//-1	Switching	AB
D141	VHD1S2076//-1	Switching	AB
D142	VHD1S2076//-1	Switching	AB
D143	VHD1S2076//-1	Switching	AB
D144	VHD1S2076//-1	Switching	AB
D145	VHD1S2076//-1	Switching	AB
D146	VHD1S2076//-1	Switching	AB
D147	VHD1S2076//-1	Switching	AB
D148, D150	RH-DX1003AFZZ	Rectifier	AD
D149, D151	RH-DX1004AFZZ	Rectifier	AD

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
D152, D153	VHEEQA0106S-1	Voltage Regulator	AD
D154	RH-DX1006AFZZ	Surge Absorber	AC
D155	VHD1S2076//-1	Electric Discharge	AB
D156	RH-DX1006AFZZ	S.C.R. Bias	AC
D157	VHD1S2076//-1	Differential	AB
D501, D502	VHD1S2076//-1	Differential	AB
ZD101, ZD102	VHEEQA0109S-1	Zener	AD
SCR1	VHS1RC5////-1	Silicon Controlled Rectifier, Auto Stop	AK
SCR2	VHS1RC5////-1	Silicon Controlled Rectifier, Space Pause	AK

LED

D103	VHPGL30PG//-1	DOLBY NR Indicator	AG
D104	VHPGL30PR//-1	SPACE Indicator	AD
TLR301	RH-PX1002AFZZ	Seven Segment Display	AN

CONTROLS

VR101, VR102	RVR-M0057AGZZ	22K ohm (B), Playback Sensitivity Adjust	AE
' VR103, ` VR104	= A0132AFZZ RVR-A0112AFZZ	50K ohm (A), RECORD LEVEL Control	AE
VR105, VR106	RVR-M0126AGZZ	5K ohm (B), Gain Adjust	AC
VR107, VR108	RVR-M0122AFZZ	500 ohm (B), Gain Adjust	AC
VR109, VR110	RVR-B0128AFZZ	10K ohm (B), playback Level Control	AK
VR111, VR112	RVR-M130AFZZ	50K ohm (B), Meter Sensitivity Adjust	AC
VR113, VR114	RVR-B0052AGZZ	10K ohm (B), Playback Equalizer	AE
VR301	RVR-M0117AFZZ	10K ohm (B), Record/ Playback Sensitivity Adjust, Normal	AD
VR302	RVR-M0117AFZZ	10K ohm (B), Record/ Playback Sensitivity Adjust, FeCr	AD
VR303	RVR-M0117AFZZ	10K ohm (B), Record/ Playback Sensitivity Adjust, CrO_2	AD
VR304	RVR-M0117AFZZ	10K ohm (B), Record/ Playback Sensitivity Adjust, Normal	AD
VR305	RVR-M0117AFZZ	10K ohm (B), Record/ Playback Sensitivity Adjust, FeCr	AD
VR306	RVR-M0117AFZZ	10K ohm (B), Record/ Playback Sensitivity Adjust, CrO_2	AD
VR307, VR308	RVR-M0026AGZZ	5K ohm (B), Bias Current Adjust	AC

COILS

L101, L102	RCILL0052AFZZ	19KHz Low Pass Filter	AL
L103, L104	RCILB0087AGZZ	Bias Step-up	AF
L105	RCILB0085AGZZ	Bias Oscillation	AF

REF. NO.	PART NO.	DESCRIPTION	CODE
L301, L302	RCILZ0054AFZZ	Record Equalizer	AE
L303, L304	RCILZ0054AFZZ	Record Equalizer	AE
L305, L306	RCILZ0054AFZZ	Record Equalizer	AE

TRANSFORMERS

T101, T102	RTRNS0027AGZZ	Headphone Output	AE
T103	RTRNP0431AFZZ	Power	AZ

INTEGRATED CIRCUIT

IC101	RH-IX1024AFZZ	4 Input NAND	AG
IC102	RH-IX1024AFZZ	4 Input NAND	AG
IC103	RH-IX1028AFZZ	Up Down Counter	AU
IC104	RH-IX1029AFZZ	7 Segment Driver	AS
IC105	RH-IX1026AFZZ	2 Input NOR	AG
IC106	RH-IX1025AFZZ	2 Input NAND	AG
IC107	RH-IX1027AFZZ	Hex Inverter	AG
IC108	RH-IX1027AFZZ	Hex Inverter	AG

PACKAGED CIRCUITS

C401, C402	RMPTE0001AFZZ	.01MFD x 2, 250V (D.C), +80-20%, Ceramic	AB

CAPACITORS

C101, C102	VCKZPU1HB561K	560PF, 50V, +5-5%, Ceramic	AA
C107, C108	VCCSPU1HL101K	100PF, 50V, +10-10%, Ceramic	AA
C109, C110	VCCSPU1HL330K	33PF, 50V, +10 -10%, Ceramic	AA
C115, C116	VCQYKU1HM123J	.012MFD, 50V, +5-5%, Mylar	AC
C131, C132	VCQYKU1HM562J	.0056MFD, 50V, +5-5%, Mylar	AC
C133, C134	VCQYKU1HM472J	.0047MFD, 50V, +5 -5%, Mylar	AC
C135, C136	VCQYKU1HM273J	.027MFD, 50V, +5-5%, Mylar	AC
C163, C164	VCCSPU1HL271K	270PF, 50V, +10-10%, Ceramic	AB
C176	VCQYKU1HM103M	.01MFD, 50V, +20-20%, Mylar	AB
C179, C180	VCQYKU1HM222K	.0022MFD, 50V, +10-10%, Mylar	AB
C303	VCCSPU1HL330K	33PF, 50V, +10-10%, Ceramic	AA
C318	VCQYKU1HM103J	.01MFD, 50V, +5-5%, Mylar	AB
C321	VCQYKU1HM822J	.0082MFD, 50V, +5-5%, Mylar	AC
C322	VCQYKU1HM223J	.022MFD, 50V, +5-5%, Mylar	AC
C324	VCQYKU1HM822J	.0082MFD, 50V, +5-5%, Mylar	AC
C325	VCQYKU1HM123J	.012MFD, 50V, +5-5%, Mylar	AC

' A-0112 = Lange Beine

` A-0132 = Kurze Beine

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
C326	VCQYKU1HM683K	.068MFD, 50V, +10–10%, Mylar	AC
C333	VCQYKU1HM103J	.01MFD, 50V, +5–5%, Mylar	AB
C336	VCQYKU1HM822J	.0082MFD, 50V, +5–5%, Mylar	AC
C337	VCQYKU1HM223J	.022MFD, 50V, +5–5%, Mylar	AC
C339	VCQYKU1HM822J	.0082MFD, 50V, +5–5%, Mylar	AC
C340	VCQYKU1HM123J	.012MFD, 50V, +5–5%, Mylar	AC
C341	VCQYKU1HM683K	.068MFD, 50V, +10–10%, Mylar	AC
C344	VCQYKU1HM103K	.01MFD, 50V, +10–10%, Mylar	AB
C345	VCQYKU1HM333K	.033MFD, 50V, +10–10%, Mylar	AB
C346	VCQYKU1HM472K	.0047MFD, 50V, +10–10%, Mylar	AB
C347	VCQYKU1HM472K	.0047MFD, 50V, +10–10%, Mylar	AB
C348	VCCSPU1HL331K	330PF, 50V, +10–10%, Ceramic	AB
C349	VCCSPU1HL331K	330PF, 50V, +10–10%, Ceramic	AB
C352	VCQYKU1HM103K	.01MFD, 50V, +10–10%, Mylar	AB
C405	VCQYKU1HM103M	.01MFD, 50V +20 –20%, Mylar	AB
C407	VCQYKU1HM103M	.01MFD, 50V, +20 –20%, Mylar	AB
C412	VCQYKU1HM103M	.01MFD, 50V, +20 –20%, Mylar	AB
C414	VCQYKU1HM103M	.01MFD, 50V, +20 –20%, Mylar	AB
C416	RC-KZ0087AGZZ	.01MFD, 400V, +100 –0%, Ceramic	AE

ELECTROLYTIC CAPACITORS

REF. NO.	PART NO.	DESCRIPTION	CODE
C103, C104	VCEAAU1CW107Y	100MFD, 16V, +50 –10%	AC
C105, C106	VCEALU1CC106Y	10MFD, 16V, +50 –10%	AC
C111, C112	VCEAAU1AW476Y	47MFD, 10V, +50 –10%	AB
C113, C114	VCEALU1CW106M	10MFD, 16V, +20 –20%	AB
C117, C118	VCEALU1HW105M	1MFD, 50V, +20 –20%	AD
C119, C120	VCEAAU1EW476Y	47MFD, 25V, +50 –10%	AC
C121, C122	VCEALU1CW106M	10MFD, 16V, +20 –20%	AB
C123, C124	VCEALU1HW335M	3.3MFD, 50V, +20 –20%	AC
C125, C126	VCEALU1CW106M	10MFD, 16V, +20 –20%	AB
C127, C128	VCEALU1CW106M	10MFD, 16V, +20 –20%	AB
C129, 130	VCEALU1CW106M	10MFD, 16V, +20 –20%	AB
C137, C138	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C139, C140	VCEALU1HW104M	.1MFD, 50V, +20 –20%	AB
C141, C142	VCEAAU0XW476Y	47MFD, 6.3V, +50 –10%	AB
C143, C144	VCEALU1HW104M	.1MFD, 50V, +20 –20%	AB
C145, C146	VCEALU1CW106M	10MFD, 16V, +20 –20%	AB
C147, C148	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C149, C150	VCEALU1HW104M	.1MFD, 50V, +20 –20%	AB
C151, C152	VCEALU1HW334M	.33MFD, 50V, +20 –20%	AB
C153, C154	VCEALU1HW104M	.1MFD, 50V, +20 –20%	AB
C155, C156	VCEAAU1CW476Y	47MFD, 16V, +50 –10%	AC
C157, C158	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C159, C160	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C161, C162	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C165, C166	VCEAAU1EW476Y	47MFD, 25V, +50 –10%	AC
C167, C168	VCEALU1CW106M	10MFD, 16V, +20 –20%	AB
C169, C170	VCEALU1CW106M	10MFD, 16V, +20 –20%	AB
C171, C172	VCEALU1HW105M	1MFD, 50V, +20 –20%	AD
C173, C174	VCEALU1CW106M	10MFD, 16V, +20 –20%	AB
C175	VCEAAU1HW336Y	33MFD, 50V, +50 –10%	AC
C177	VCEAAU1AW477Y	470MFD, 10V, +50 –10%	AD
C178, C179	VCEALU1HW105M	1MFD, 50V, +20 –20%	AD
C301	VCEAAU1EW476Y	47MFD, 25V, +50 –10%	AC
C302	VCEALU1HC105A	1MFD, 50V, +75 –10%	AC
C304	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C305	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C306	VCEAAU1HW105Y	1MFD, 50V, +50 –10%	AB
C307	VCEAAU1HW336Y	33MFD, 50V, +50 –10%	AC
C308	VCEALU1EW475M	4.7MFD, 25V, +20 –20%	AD
C309	VCEAAU1CW107Y	100MFD, 16V, +50 –10%	AC
C310	VCEAAU1AW227Y	220MFD, 10V, +50 –10%	AC
C311	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC
C312	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC
C313	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C315	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C316	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C317	VCEAAU1HW475Y	4.7MFD, 50V, +50 –10%	AB
C320	VCEAAU1HW475Y	4.7MFD, 50V, +50 –10%	AB
C323	VCEAAU1HW475Y	4.7MFD, 50V, +50 –10%,	AB
C327	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C328	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C329	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C330	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C331	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C332	VCEAAU1HW475Y	4.7MFD, 50V, +50 –10%	AB
C335	VCEAAU1HW475Y	4.7MFD, 50V, +50 –10%	AB
C338	VCEAAU1HW475Y	4.7MFD, 50V, +50 –10%	AB
C342	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C343	VCEAAU1EW107Y	100MFD, 25V, +50 –10%	AC
C350	VCEAAU1EW476Y	47MFD, 25V, +50 –10%	AC

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
C351	VCEAAU1EW106Y	10MFD, 25V, +50 −10%	AB
C403	VCEAAU1HW477Y	470MFD, 50V, +50 −10%	AG
C404	VCEAAU1VW477Y	470MFD, 35V, +50 −10%	AE
C406	VCEAAU1VW477Y	470MFD, 35V, +50 −10%	AE
C408	VCEAAU1EW227Y	220MFD, 25V, +50 −10%	AC
C409	VCEAAU1EW228Y	2200MFD, 16V, +50 −10%	AH
C410	VCEAAU1CW477Y	470MFD, 16V, +50 −10%	AD
C411	VCEAAU0XW227Y	220HFD, 6.3V, +50 −10%	AC
C413	VCEAAU1AW108Y	1000MFD, 10V, +50 −10%	AD
C415	VCEAAU1CW476Y	47MFD, 16V, +50 −10%	AC
C417, C418	VCEAAU1EW107Y	100MFD, 25V, +50 −10%	AC
C501	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	AB
C502	VCEAAU1CW227Y	220MFD, 16V, +50 −10%	AC
C503	VCEALU1HW104M	.1MFD, 50V, +20 −20%	AB
C504, C505	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	AB
C601, C602, C603, C604	VCEALU1HW105M	1MFD, 50V, +20 −20%	AD
C605, C606	VCEAAU1EW476Y	47MFD, 25V, +50 −10%	AC

RESISTORS

(Unless otherwise specified resistors are 1/4W, ±5%, Carbon type.)

REF. NO.	PART NO.	DESCRIPTION	CODE
R101, R102	VRD-ST2EE331J	330 ohm	AA
R103, R104	VRD-ST2EE101J	100 ohm	AA
R105, R106	VRD-ST2EE223J	22K ohm	AA
R107, R108	VRD-ST2EE184J	180K ohm	AA
R109, R110	VRD-ST2EE184J	180K ohm	AA
R111, R112	VRD-ST2EE101J	100 ohm	AA
R113, R114	VRD-ST2EE154J	150K ohm	AA
R115, R116	VRD-ST2EE104J	100K ohm	AA
R117, R118	VRD-ST2EE103J	10K ohm	AA
R119, R120	VRD-ST2EE221J	220 ohm	AA
R121, R122	VRD-ST2EE821J	820 ohm	AA
R123, R124	VRD-ST2EE564J	560K ohm	AA
R125, R126	VRD-ST2EE392J	3.9K ohm	AA
R127, R128	VRD-ST2EE682J	6.8K ohm	AA
R129, R130	VRD-ST2EE183J	18K ohm	AA
R131, R132	VRD-ST2EE332J	3.3K ohm	AA
R133	VRD-ST2EE471J	470 ohm	AA
R134	VRS-PT3AB272J	2.7K ohm, 1W, +5 −5%, Oxide Film	AB
R135, R136	VRD-ST2EE104J	100K ohm	AA
R137, R138	VRD-ST2EE473J	47K ohm	AA
R139, R140	VRD-ST2EE474J	470K ohm	AA
R141, R142	VRD-ST2EE471J	470 ohm	AA
R143, R144	VRD-ST2EE332J	3.3K ohm	AA
R145, R146	VRD-ST2EE682J	6.8K ohm	AA
R147, R148	VRD-ST2EE101J	100 ohm	AA
R149, R150	VRD-ST2EE333J	33K ohm	AA
R151, R152	VRD-ST2EE121J	120 ohm	AA
R153, R154	VRD-ST2EE222J	2.2K ohm	AA
R155, R156	VRD-ST2EE471J	470 ohm	AA
R157, R158	VRD-ST2EE333J	33K ohm	AA
R159, R160	VRD-ST2EE121J	120 ohm	AA
R161, R162	VRD-ST2EE225J	2.2M ohm	AA
R163, R164	VRD-ST2EE104J	10K ohm	AA
R165, R166	VRD-ST2EE154J	150K ohm	AA
R167, R168	VRD-ST2EE184J	180K ohm	AA
R169, R170	VRD-ST2EE273J	27K ohm	AA
R171, R172	VRD-ST2EE822J	8.2K ohm	AA
R173, R174	VRD-ST2EE154J	150K ohm	AA
R175, R176	VRD-ST2EE223J	22K ohm	AA
R177, R178	VRD-ST2EE272J	2.7K ohm	AA
R179, R180	VRD-ST2EE333J	33K ohm	AA
R181, R182	VRD-ST2EE473J	47K ohm	AA
R183, R184	VRD-ST2EE332J	3.3K ohm	AA
R185, R186	VRD-ST2EE222J	2.2K ohm	AA
R187, R188	VRD-ST2EE822J	8.2K ohm	AA
R189, R190	VRD-ST2EE182J	1.8K ohm	AA
R191, R192	VRD-ST2EE684J	680K ohm	AA
R193, R194	VRD-ST2EE153J	15K ohm	AA
R195, R196	VRD-ST2EE822J	8.2K ohm	AA
R197, R198	VRD-ST2EE221J	220 ohm	AA
R199, R200	VRD-ST2EE103J	10K ohm	AA
R201, R202	VRD-ST2EE822J	8.2K ohm	AA

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
R203, R204	VRD-ST2EE822J	8.2K ohm	AA
R205, R206	VRD-ST2EE333J	33K ohm	AA
R207, R208	VRD-ST2EE124J	120K ohm	AA
R209, R210	VRD-ST2EE473J	47K ohm	AA
R211, R212	VRD-ST2EE272J	2.7K ohm	AA
R213, R214	VRD-ST2EE102J	1K ohm	AA
R215, R216	VRD-ST2EE330J	33 ohm	AA
R217, R218	VRD-ST2EE470J	47 ohm	AA
R219, R220	VRD-ST2EE153J	15K ohm	AA
R221, R222	VRD-ST2EE274J	270K ohm	AA
R223, R224	VRD-ST2EE224J	220K ohm	AA
R225, R226	VRD-ST2EE274J	270K ohm	AA
R227, R228	VRD-ST2EE224J	220K ohm	AA
R229, R230	VRD-ST2EE563J	56K ohm	AA
R231, R232	VRD-ST2EE102J	1K ohm	AA
R233, R234	VRD-ST2EE181J	180 ohm	AA
R235, R236	VRD-ST2EE101J	100 ohm	AA
R237, R238	VRD-ST2EE273J	27K ohm	AA
R239, R240	VRD-ST2EE221J	220 ohm	AA
R241, R242	VRD-ST2EE274J	270K ohm	AA
R243, R244	VRD-ST2EE102J	1K ohm	AA
R245, R246	VRD-ST2EE472J	4.7K ohm	AA
R247, R248	VRD-ST2EE221J	220 ohm	AA
R249, R250	VRD-ST2EE332J	3.3K ohm	AA
R251, R252	VRD-ST2EE152J	1.5K ohm	AA
R253, R254	VRD-ST2EE473J	47K ohm	AA
R255	VRS-PT3AB102J	1K ohm, 1W, +5 −5%, Oxide Film	AB
R256	VRS-PT3AB272J	2.7K ohm, 1W, +5 −5%, Oxide Film	AB
R257	VRS-PT3DB331J	330 ohm, 2W, +5 −5%, Oxide Film	AB
R258	VRS-PT3DB271J	270 ohm, 2W, +5 −5%, Oxide Film	AB
R259	VRS-PT3DB101J	100 ohm, 2W, +5 −5%, Oxide Film	AB
R261, R262	VRD-ST2EE272J	2.7K ohm	AA
R301	VRD-ST2EE682J	6.8K ohm	AA

REF. NO.	PART NO.	DESCRIPTION	CODE
R302	VRD-ST2EE222J	2.2K ohm	AA
R303	VRD-ST2EE392J	3.9K ohm	AA
R304	VRD-ST2EE153J	15K ohm	AA
R305	VRD-ST2EE823J	82K ohm	AA
R306	VRD-ST2EE392J	3.9K ohm	AA
R307	VRD-ST2EE101J	100 ohm	AA
R308	VRD-ST2EE272J	2.7K ohm	AA
R309	VRD-ST2EE104J	100K ohm	AA
R310	VRD-ST2EE563J	56K ohm	AA
R311	VRD-ST2EE103J	10K ohm	AA
R312	VRD-ST2EE103J	10K ohm	AA
R313	VRD-ST2EE100J	10 ohm	AA
R314	VRD-ST2EE333J	33K ohm	AA
R315	VRD-ST2EE103J	10K ohm	AA
R316	VRD-ST2EE103J	10K ohm	AA
R317	VRD-ST2EE102J	1K ohm	AA
R318	VRD-ST2EE103J	10K ohm	AA
R319	VRD-ST2EE100J	10 ohm	AA
R320	VRD-ST2EE821J	820 ohm	AA
R321	VRD-ST2EE101J	100 ohm	AA
R322	VRD-ST2EE563J	56K ohm	AA
R323	VRD-ST2EE103J	10K ohm	AA
R324	VRD-ST2EE822J	8.2K ohm	AA
R325	VRD-ST2EE101J	100 ohm	AA
R326	VRD-ST2EE682J	6.8K ohm	AA
R327	VRD-ST2EE393J	39K ohm	AA
R328	VRD-ST2EE393J	39K ohm	AA
R329	VRD-ST2EE393J	39K ohm	AA
R330	VRD-ST2EE393J	39K ohm	AA
R331	VRD-ST2EE104J	100K ohm	AA
R332	VRD-ST2EE223J	22K ohm	AA
R333	VRD-ST2EE472J	4.7K ohm	AA
R334	VRD-ST2EE470J	47 ohm	AA
R336	VRD-ST2EE123J	12K ohm	AA
R337	VRD-ST2EE472J	4.7K ohm	AA
R338	VRD-ST2EE330J	33 ohm	AA
R339	VRD-ST2EE272J	2.7K ohm	AA
R340	VRD-ST2EE123J	12K ohm	AA
R341	VRD-ST2EE332J	3.3K ohm	AA
R342	VRD-ST2EE220J	22 ohm	AA
R343	VRD-ST2EE392J	3.9K ohm	AA
R344	VRD-ST2EE123J	12K ohm	AA
R345	VRD-ST2EE333J	33K ohm	AA
R346	VRD-ST2EE104J	100K ohm	AA
R347	VRD-ST2EE332J	3.3K ohm	AA
R348	VRD-ST2EE223J	22K ohm	AA
R349	VRD-ST2EE682J	6.8K ohm	AA
R350	VRD-ST2EE393J	39K ohm	AA
R351	VRD-ST2EE393J	39K ohm	AA
R352	VRD-ST2EE393J	39K ohm	AA
R353	VRD-ST2EE393J	39K ohm	AA
R354	VRD-ST2EE104J	100K ohm	AA
R355	VRD-ST2EE223J	22K ohm	AA
R356	VRD-ST2EE392J	3.9K ohm	AA
R357	VRD-ST2EE470J	47 ohm	AA
R359	VRD-ST2EE123J	12K ohm	AA
R360	VRD-ST2EE472J	4.7K ohm	AA
R361	VRD-ST2EE330J	33 ohm	AA
R362	VRD-ST2EE272J	2.7K ohm	AA
R363	VRD-ST2EE123J	12K ohm	AA
R364	VRD-ST2EE332J	3.3K ohm	AA
R365	VRD-ST2EE220J	22 ohm	AA
R366	VRD-ST2EE392J	3.9K ohm	AA
R367	VRD-ST2EE123J	12K ohm	AA
R368	VRD-ST2EE333J	33K ohm	AA

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
R369	VRD-ST2EE104J	100K ohm	AA
R370	VRD-ST2EE332J	3.3K ohm	AA
R371	VRD-ST2EE223J	22K ohm	AA
R372	VRD-ST2EE332J	3.3K ohm	AA
R373	VRD-ST2EE562J	5.6K ohm	AA
R374	VRD-ST2EE472J	4.7K ohm	AA
R375	VRD-ST2EE472J	4.7K ohm	AA
R376	VRD-ST2EE102J	1K ohm	AA
R377	VRD-ST2EE330J	33 ohm	AA
R378	VRD-ST2EE330J	33 ohm	AA
R379	VRD-ST2HD1R0J	1 ohm, 1/2W, +5 –5%, Carbon	AA
R406	VRS-PT3AB102K	1K ohm, 1W, +10 –10%, Oxide Film	AB
R408	VRD-ST2EE392J	3.9K ohm	AA
R409	VRD-ST2EE562J	5.6K ohm	AA
R410	VRD-ST2EE222J	2.2K ohm	AA
R411	VRS-PA3DB271J	270 ohm, 2W, +5 –5%, Oxide Film	AB
R412	VRS-PT3DB150K	15 ohm, 2W, +10 –10%, Oxide Film	AB
R413	VRS-PT3AB561K	560 ohm, 1W, +10 –10%, Oxide Film	AB
R414	VRD-ST2EE101J	100 ohm	AA
R415	VRD-ST2EE154J	150K ohm	AA
R417	VRD-ST2EE103J	10K ohm	AA
R418	VRD-ST2EE101J	100 ohm	AA
R501	VRD-SU2EY822J	8.2K ohm	AA
R502,	VRD-ST2EY331J	330 ohm	AA
R503,			
R504,			
R505,			
R506,			
R507,			
R508			
R509	VRD-ST2EY152J	1.5K ohm	AA
R510	VRD-ST2EY122J	1.2K ohm	AA
R511	VRD-ST2EY102J	1K ohm	AA
R512	VRD-ST2EY223J	22K ohm	AA
R513	VRD-ST2EY101J	100 ohm	AA
R601,	VRD-ST2EE105J	1M ohm	AA
R602			
R603,	VRD-ST2EE473J	47K ohm	AA
R604			
R605,	VRD-ST2EE563J	56K ohm	AA
R606			
R607,	VRD-ST2EE152J	1.5K ohm	AA
R608			
R609,	VRD-ST2EE272J	2.7K ohm	AA
R610			

MISCELLANEOUS

REF. NO.	PART NO.	DESCRIPTION	CODE
001	GCAB-3017AFSA	Cabinet	AZ
002	GCOVD3003AFSA	Lid, Cabinet Top	
003	GCOVA1054AFSA	Guide, Lever Switch, Large	AC
004	GCOVA1061AF00	Cover, Hole	AA
005	GCOVA1063AFSA	Cover, Mechanism	AH
006	GDORF3052AFSA	Door, Cassette Compartment	AF
007	GITAS0012AFSA	Decoration Plate, Cabinet	AR
008	PSPAS0051AFZZ	Spacer, Push Switch	AB
009	GITAU0004AFZZ	Cabinet Bottom	AP
010	GLEGP0050AF00	Leg 18207	AC
011	GWAKP1055AFSA	Frame, Level Meter	AG
012	HDECA0268AFSA	Decoration Cassette Compartment Door 08203	AK

REF. NO.	PART NO.	DESCRIPTION	CODE
013	HPNLC3254AFSA	Panel, Front 31104	BC
014 31201	JBOTN0055AFSA	Button Assembly, Mechanism	AW
015	JKNBM1004SESF	Knob, POWER/SPACE/ INPUT/LIMITER	AE
016	JKNBN0312AFSA	Knob, RECORD	AG
017	JKNBN0313AFSA	Knob, OUTPUT	AG
018	JKNBP0058AFSA	Knob, BIAS/EQ/DOLBY NR	AH
019	KCOUB0058AFZZ	Counter	AN
020	LANGF0337AFZZ	Block, Record Safety Lever	AF
021	LANGF0346AFZZ	Bracket, Strengthen, Front	AC
022	LANGK0167AFZZ	Bracket, Right Side	AE
023	LANGK0168AFZZ	Bracket, Left Side	AE
024	LANGT0515AFZZ	Bracket, Counter	AD
025	LANGT0516AFZZ	Bracket, Counter Pulley	AG
026	LANGT0518AFZZ	Bracket, Front	AM
027	MECA-A0417L	Bracket, Mechanism, Left Side	AC
028	MECA-A0417R	Bracket, Mechanism, Right Side	AC
029	LANGT0521AFZZ	Bracket, Cassette Illumination Lamp	AE
030	LANGT0523AFZZ	Bracket, Level Meter	AD
031	LANGT0524AFZZ	Bracket, Bias Oscillation P.W.B., Left Side	AC
032	LANGT0525AFZZ	Bracket, Bias Oscillation P.W.B., Right Side	AC
033	LANGT0559AFSA	Bracket, Terminal, Rear	AS
034	LCHSM0229AFZZ	Mounting Plate	AN
035	LBOSA0052AFFD	Spacer, Bias Oscillation P.W.B.	AC
036	LBSHC0004AGZZ	Bushing, Mains Supply Cord	AC
	LBSHC0007AFZZ	(See Table 2)	AB
037	LBSHS0001AG00	Cushion, Capstan Motor	AA
038	LDAIH0050AFZZ	Head Mount, APF	AB
039	LHLDW1050AFZZ	Wire Holder	AB
040	LHLDW1051AFZZ	Wire Holder	AB
041	LHLDW1052AFZZ	Wire Holder (See Figure 68)	AA
042	LHLDW1062AFZZ	Wire Holder	AA
043	MLEVP0066AF00	Lever, Record Safety	AC
044	LHLDW3003AFFD	Wire Holder	AA
045	LHLDW3007AGZZ	Wire Holder	AA
047	MLOKC0052AFZZ	Lever, Cassette Holder Lock	AC
048	LHLDW3053AFZZ	Wire Holder	AA
049	LHLDW9003CEZZ	Wire Holder	AA
050	LX-BZ0214AFZZ	Screw, Flywheel Thrust Adjust	AB
051	LX-WZ0031AGFE	Washer, Special	AA
053	MLEVP0064AFZZ	Lever, Playback Idler 14416	AD
055	MLOKC0053AFFD	Lever, Cassette Compartment Door Lock	AC
056	MSPRP0122AFZZ	Spring, Cassette Retaining	AE
057	MSPRT0337AFFW	Spring, Door Lock Lever	AA
058	MSPRT0338AFFW	Spring, Cassette Compartment Door	AB
059	NBLTH0052AF00	Belt, Drive	AD
~~060~~	NBLTM0050AF00	Belt, Counter	AE
061	NBRGC0051AFZZ	Bearing, Capstan Shaft	AF
~~062~~	NDAIR0105AFSA	Turntable, Take-up	AG
063	NDAIR0106AFSA	Turntable, Supply	AD
064	NFLYC0058AFZZ	Flywheel	AR
065	NIDR-0021AGZZ	Idler, Take-up	AD
066	NPLYR0054AF00	Roller, Capstan Shaft	AC
067	NROLW0002AFZZ	Roller, Fast Forward/Rewind	AH
068 104A	NROLY0005AFZZ	Pressure Roller Assembly	AG
069	NSFTZ0053AFFF	Boss, Cassette Compartment Door	AB
070	PCOVW7101AFZZ	Insulator, Micro Switch	AA

HDECA0268AFSB 09513

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
071	PCOVW9057AG00	Insulator, Micro Switch	AA
072	PCUSG0061AF00	Cushion, Rubber	AB
073	PCUSG0062AF00	Cushion, Rubber	AA
074	PCUSS0053AF00	Cushion, Volume Control P.W.B.	AB
075	PCUSU0214AFZZ	Cushion, Cassette Compartment Door	AA
076	PFLT-0265AFZZ	Felt, Back Tension Lever	AA
077	PFLT-0270AF01	Felt, Leg	AB
078	PFLT-0272AF00	Felt, Terminal Bracket	AA
079	PGIDM0052AF00	Guide, Cassette, Left Side	AD
080	PGIDM0053AF00	Guide, Cassette, Right Side	AD
081	PCUSU0215AFZZ	Cushion, Meter	AA
082	PMIR-0050AFZZ	Mirror	AA
083	PRDAR0101AFFW	Heatsink, Transistor (Q145,Q147)	AB
084	PSHEZ0060AFZZ	Insulator, Front Bracket	AB
085	PSPAG0024AG00	Holder, Reed Switch P.W.B.	AB
6	PSPAN0004AF09	Spacer, Jacks	AB
u87	PSPAV0052AFZZ	Tube, L.E.D.	AA
088	QACCB0052AF09	Cord, Mains Supply (for UK)	AM
	QACCL0001AFZZ	Cord, Mains Supply (SAA)	AQ
	QACCV0001AGZZ	Cord, Mains Supply (KEMA) See Table 2	AN
	QACCZ0002AG08	Cord, Mains Supply, without plug	AF
	QACCZ0002TA0F	Cord, Mains Supply, with Plug	AF
089	QHWS-3001AGFN	Lug Terminal, Ground	AA
090	QLUGL0201SEZZ	Lug Terminal, 3-Terminal	AA
091	QLUGL0250AFZZ	Lug Terminal, 2-Terminal	AC
092	QLUGP0105AGZZ	Lug Terminal (See Figure 68)	AA
093	QLUGP0111CEFW	Lug Terminal (See Figure 68)	AA
094	QLUGQ0106CEZZ	Lug Terminal (See Figure 68)	AA
095	QLUGZ0101SEFW	Lug Terminal (See Figure 68)	AA
096	QLUGZ0103CEFW	Lug Terminal (See Figure 68)	AA
097	QPWBF0510AFZZ	Printed Wiring Board, Reed Switch	AC
6	QPWBF0463AFZZ	Printed Wiring Board, Record/Playback Amp.	AN
099	QPWBF0464A Z	Printed Wiring Board, Bias Oscillation	AL
100	QPWBF523AFZZ	Printed Wiring Board, Volume Control	AM
101	QPWBF0466AFZZ	Printed Wiring Board, Push Switches	AE
102	QPWBF0505AFZZ	Printed Wiring Board, Power Supply	AF
103	QPWBF0468AFZZ	Printed Wiring Board, Intermediate	AF
104	QPWBF0470AFZZ	Printed Wiring Board, RECORD/DOLBY NR Indicator	AC
105	QPWBF0471AFZZ	Printed Wiring Board, SPACE Indicator	AC
106	QTIPZ0002SGZZ	Tip, Connector (See Figure 68)	AA
107	RHEDA0054AFZZ	Head, Erase	AN
108	RHEDE0002AGZZ	Head, A.P.F.	AP
109	RHEDH0058AFZZ	Head, Record/Playback	BA
110	RMOTM0055AFZZ	Motor, Fast Forward/Rewind	AX
11	RMOTV0054AFZZ	Motor, Capstan Tonwelle	BA
12	LBOSC0051AFFD	Pole, Record/Playback Switch Lever	AB
113	LBOSC0052AFFD	Pole, Record/Playback Switch Lever	AB
114	LANGF0349AFZZ	Bracket, Strengthen, Mechanism Block	AA
115	LANGF0347AFZZ	Bracket, Strengthen, Terminal Bracket, Left Side	AB
116	LANGF0348AFZZ	Bracket, Strengthen, Terminal Bracket, Right Side	AB
117	PCUSS0066AFZZ	Cushion, Mechanism Block	AA
118	MLEVF0561AFFD	Lever, Record/Playback Switch	AD
119	MLEVF0562AFFD	Lever, Record/Playback Switch	AD
120	MLEVF0563AFFD	Lever, Record/Playback Switch	AB
121	LANGF0158AGZZ	Bracket, Strengthen, Front, Right Side	AB
122	LANGF0159AGZZ	Bracket, Strengthen, Front, Left Side	AB
123	MSPRT0339AFFJ	Spring, Record/Playback Switch Lever	AA
125	PSPAG0022AG00	Cushion, Cassette Compartment Door	AA
126	NBALS0004AGFJ	Steel Ball, 3φ	AA
130	MC-0417ASY	Mechanism Mounting Plate	AX
131	SC-ASY0417	Sub-chassis	AK
132	OS-LEV0417	Lever, Over Stroke	AC
133	APL-ACT-LEV	Lever, A.P.F. Operating	AD
134	MAN-ACT-LEV	Lever, Mains	AD
135	FF-ACT-LEV	Lever, Fast Forward	AC
136	REC-CON-LEV	Lever, Record Connecting	AD
137	EJ-CON-LEV	Lever, Eject	AD
138	PAS-LEV417A	Lever, Pause Operating	AC
139	PAS-LEV417B	Lever, Pause Operating	AD
140	SR-LEV417L	Lever, Fast Forward/Rewind Roller	AC
141	SR-LEV417R	Lever, Fast Forward/Rewind Roller	AC
142	PR-AL0417	Lever, Pressure Roller Assembly	AC
143	APL-A-P417	Lever, A.P.F. Head	AD
144	LOK-LEV417	Lock, Push Buttons	AE
145	S-PAS-LEV-A	Lever, Space Pause	AC
146	S-PAS-LEV-B	Lever, Space Pause	AD
147	MUT-SA-LEV	Lever, Muting Switch	AD
148	BAKT-LEV417	Lever, Back Tension	AC
149	R-SPN-L417	Lever, Record Connecting	AD
150	RW-ACT-LEV	Lever, Rewind	AC
151	MOT-ANG417	Bracket, Capstan Motor	AC
152	MOT-PLT417	Bracket, Fast Forward/Rewind Motor	AB
153	FLY-A-ASY	Bracket, Flywheel	AE
154	LOK-ANG417	Bracket, Push Buttons Lock	AC
155	CT-HOL-STP	Stopper, Cassette Holder	AD
156	APL-HD-PLT	A.P.F. Head Mounting Plate	AB
157	SW-ANG417A	Bracket, Pause Switch	AC
158	MOT-SLV417	Sleeve, Motor Cushion Rubber	AC
159	SPAS-417A	Spacer, Mains Lever	AA
160	PL-ROD417	Rod, Auto Stop Solenoid	AA
161	SPR-0417AT	Spring, Pressure Roller Assembly Lever	AA
162	SPR-0417BT	Spring, Playback Idler Lever	AA
163	SPR-417CD	Spring, A.P.F. Head Lever	AA
164	MSPRC0031AGMN	Spring, Record/Playback Head Azimuth	AA

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
165	SPR-0417FD	Spring, A.P.F. Head Azimuth	AA
166	SPR-0417GT	Spring, Record Connecting Lever	AA
167	SPR-0417HT	Spring, Fast Forward/Rewind Roller Lever	AB
168	SPR-0417IT	Spring, Push Bottons Lock	AB
169	SPR-0417KT	Spring, Eject Lever	AB
170	SPR-0417NT	Spring, Over Stroke Lever	AB
171	SPR-0417PT	Spring, Over Stroke Lever	AA
172	SPR-0417QT	Spring, Pause Operating Lever	AA
173	SPR-0417RT	Spring, Pause Operating Lever	AA
174	SC-OSA-BANE	Retainer, Sub-chassis	AB
175	925 SPR-0417U	Spring, Pause Switch 19229	AB
176	SPR-0417JT	Spring, A.P.F. Operating Lever	AA
177	SPR-0417VT	Spring, Back Tension Lever	AB
178	SPR-0417XT	Spring, Pause Switch	AA
179	SPR-0417LT	Spring, Eject Lever	AA
180	CT-HOL-HON	Holder, Cassette	AL
181	SPR-SLND	Sping, Solenoid	AA
182	HINDP0110AFSA	Indication Plate, Seven Segment LED	AB
183	PCOVP1152AFZZ	Cover, C418	AB
184	QSOCZ2450AFZZ	Socket Board, Assembly	AK
185	LX-NZ0109AFFN	Nut, Microphone Jack	AB
186	QPWBE0064AFZZ	Printed Wiring Board, APLD	AS
187	QCNTF0001AFZZ	Rubber, APLD Selecfor KEY	AH
188	LANGT0522AFZZ	Bracket, APLD Selector KEY	AC
189	MSPRP0116AFFW	Spring, APLD Selector KEY	AD
190	JKNBZ0119AFSA	APLD Selector KEY, 9	AC
191	JKNBZ0118AFSA	APLD Selector KEY, 8	AC
192	JKNBZ0117AFSA	APLD Selector KEY, 7	AC
193	JKNBZ0116AFSA	APLD Selector KEY, 6	AC
194	JKNBZ0115AFSA	APLD Selector KEY, 5	AC
195	JKNBZ0114AFSA	APLD Selector KEY, 4	AC
196	JKNBZ0113AFSA	APLD Selector KEY, 3	AC
197	JKNBZ0112AFSA	APLD Selector KEY, 2	AC
198	JKNBZ0111AFSA	APLD Selector KEY, 1	AC
199	JKNBZ0120AFSA	APLD Selector KEY, C	AC
201	QPWBE0063AFZZ	Printed Wiring Board, IC 18303	AF
202	GCOVA1069AFSA	Cover, Counter	AC
203	PFLT-0281AFZZ	Felt, RECORD Knob	AB
204	QPWBF0494AFZZ	Printed Wiring Borad, Input/ Output Terminal	AF
205	PCOVW9104AFZZ	Partition, Fiber	AA
206	PSLDC3056AFZZ	Shield, MIC and PHONES Jack	AF
207	QFSHD1001AGZZ	Fuse Holder, AC Line (See Figure 68)	AD
208	PSPAB0103AFFW	Spacer, Voltage Selector Socket	AA
209	QPLGA0201AGZZ	Plug, Mains Supply Cond. (See Figure 69)	AE
210	QPLGAL050AGZZ	Plug, Mains Supply Cond. (See Figure 69)	AE
211	QFSHA1001SGZZ	Holder, Pilot Lamp (PL1)	AB
PG1	QCNCM0604SGZZ	Plug, 6 Pin	AD
PG2	QCNCM0402SGZZ	Plug, 4 Pin	AD
PG3	QCNCM094CAFZZ	Plug, 3 Pin	AD
PG4	QCNCM0503SGZZ	Plug, 5 Pin	AD

REF. NO.	PART NO.	DESCRIPTION	CODE
PG5	QCNCM1201AGZZ	Plug, 12 Pin	AE
PG6	QCNCM0402SGZZ	Plug, 4 Pin	AD
PG7	QCNCM0503SGZZ	Plug, 5 Pin	AD
PG8	QCNCM1001SGZZ	Plug, 10 Pin	AE
SO1	QCNCW0603SGZZ	Socket, 6 Pin	AB
SO2	QCNCW0401SGZZ	Socket, 4 Pin	AB
SO3	QCNCW086CAFZZ	Socket, 3 Pin	AB
SO4	QCNCW0502SGZZ	Socket, 5 Pin	AB
SO5	QCNCW1201AGZZ	Socket, 12 Pin	AC
SO6	QCNCW0401SGZZ	Socket, 4 Pin	AB
SO7	QCNCW0502SGZZ	Socket, 5 Pin	AB
SO8	QCNCW1002SGZZ	Socket, 10 Pin	AB
	QCNW-0127AFZZ	Connecting Cord	AM
SO9	QSOCE0410AGZZ	Socket, Voltage selector	AH
SO10	not Available	Socket, Record/Playback	–
J101, J102	QJAKE0026AGZZ	Jack, Microphones	AG
J104	QJAKE0027AGZZ	Jack, Headphones	AF
J103 (A ~ D)	not Available	Jack, LINE IN Left/Right LINE OUT Left/Right (Parts of 184)	–
SW1, SW2	QSW-S0175AFZZ	Switch, Record/Playback	AK
SW3	QSW-S0079AGZZ	Switch, Muting	AF
SW4	QSW-S0174AFZZ	Switch, Pause	AG
SW5,	QSW-P0125AFZZ	Switch, SPACE	AL
SW6,		Switch, INPUT Selector 09203	
SW7		Switch, LIMITER	
SW8	QSW-B0070AFZZ	Switch, BIAS selector (HIGH-MID-LOW)	AH
SW9	QSW-B0059AFZZ	Switch, EQ Selector (CrO_2-FeCr-NORM)	AK
SW10	QSW-B0059AFZZ	Switch, DOLBY NR/MPX FILTER (ON-OFF)	AH
SW11	QSW-L0051AFZZ	Switch, Reed, Auto Stop	AH
SW12	QSW-M0013AGZZ	Switch, Fast Forward	AH
SW13	QSW-M0013AGZZ	Switch, Rewind	AH
SW14	QSW-M0013AGZZ	Switch, Capstan Motor	AH
SW15	QSW-M0013AGZZ	Switch, Pause Solenoid	AH
SW16	QSW-F0041AGZZ	Switch, APLD	AD
SW17	QSW-M0013AGZZ	Switch, Auto Stop	AH
SW18	QSW-M0013AGZZ	Switch, Pause	AH
SW19	QSW-P0112AFZZ	Switch, Fcz	AL
TE101	QTANN0150AFZZ	Terminal, GND	AD
PL1	RLMPP0053AFZZ ~ 55	Pilot Lamp, Cassette Compartment + Meter 18	AD
PL2, PL3	~~Not Available~~ RLMPM0059AFZZ	~~Part of Meter~~	4F
ME101 ME102	RMTRL0115AFZZ	Meter	AW
SOL301	RPLU-0054AFZZ	Solenoid, Auto Stop	AN
SOL302	RPLU-0055AFZZ	Solenoid, Space Pause	AL
F1	QFS-C800CAGNI	Fuse, 80mAT (240V)	AG
F1	QFS-C801CAGNI	Fuse, 800mAT (110/220V)	AE
F2, F3, F4	QFS-C801CAGNI	Fuse, 800mAT	AE
	PRNGP0001AFZZ	Ring Cabinet Top Lid	AB